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ABSTRACT

This book is designed to assist educators' exploration of the Internet and educational resources available online. An overview lists the five basic types of information exchange possible on the Internet, and outlines five corresponding telecomputing options. The book contains an overview and four sections. The chapters in Section One, "Information Resources," focus on: (1) Gopher Tools; (2) The World Wide Web; (3) Interactive Telnet Sessions; (4) File Transfers on the Internet; and (5) Receiving and Uncompressing Files. Section Two, "Interpersonal Resources," contains chapters: (6) Electronic Mail Services; (7) Internet-Based Discussion Groups; and (8) Finding People on the Internet. Section Three, "Educational Applications," includes chapters: (9) Telecollaborative Educational Activities, including interpersonal exchanges, information collections, problem-solving projects, and an educational telecomputing archive; and (10) Teleresearch Activities. Section Four consists of five appendixes which list recommended gophers, World Wide Web pages; telnet sites; FTP archives; and mailing lists; and an index. (AEF)

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ED 417 711

Way OF THE Ferret

Finding and Using Educational Resources on the Internet

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About the Author

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Harris writes a column for educators in *Learning and Leading With Technology* entitled "Mining the Internet," and coordinates a number of educational telecomputing projects on the Internet. One of these projects is the Electronic Emissary, a service that matches volunteer subject matter experts (SMEs) with teachers and their classes studying topics in the SMEs' fields of expertise, so that teaching and learning can occur asynchronously via electronic mail.

Harris offers Internet-related presentations and workshops at state, national, and international educational computing conferences, such as the Texas Computer Educators' Association Annual Conference, the National Educational Computing Conference, and Tel•Ed. She also teaches a "mostly online" Internet-based telecomputing graduate course each year at the University of Texas at Austin.

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Way of the Ferret

Finding and Using Educational Resources on the Internet

Judi Harris

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I dedicate this book with love to my father, Gerald Harris, who encouraged me to play with machines as a child and insisted that I learn to care for them properly. This special sensitivity, developed without regard to gender-specific stereotypes, allows me to continue to explore new computer-mediated worlds and to freely share the results of my electronic expeditions with others.

Judi Harris
Austin, Texas
September 1995

Table of Contents

Preface ..... **xi**
Audience xii
Conventions xii

Overview **1**
Telecomputing Options 2
Electronic Mail 2
Computer Conferencing 3
Interactive Telnet Sessions 3
Noninteractive File Transfer Protocol (FTP) Sessions 3
Gopher and World Wide Web Sessions 3
Acquiring an Internet Account 4
Gaining Access 4
Costs 5
Curriculum Ideas 5

Section 1 • Informational Resources **7**
Chapter 1 • Gopher Tools **9**
Gopher 10
Getting to the Home Gopher 11
Making Choices 12
Gophering Remotely 14
Bookmarks 15
Getting to a Specific Gopher 17
Veronica—Searches by Topic 18
Veronica's Popularity 19
A Sample Search 21

Jughead Searches for Gopher Directory Names 23
Public Gopher Sites 24
Chapter 2 • The World Wide Web 27
How to Get There 31
WWW Bookmarks 34
WWW Searches 34
Text-Only Browsers—Lynx 36
Navigating With Lynx 39
Opening URLs in Lynx 40
Saving Places and Files in Lynx 42
Multimedia vs. Text-Only Browsers 44
Chapter 3 • Interactive Telnet Sessions 45
Telnet—Realtime Connections 45
Using Telnet 46
The Telnet Command 46
Telnet Resource Directories 48
Single-Resource Telnet Sites 48
Resource Collection Sites 50
LIBS—Electronic Library Card Catalogs 51
Other Resource Collection Sites 52
Wide Area Information Server (WAIS) 53
Chapter 4 • File Transfers on the Internet 59
Transferring ASCII Text Files Using FTP 60
Connecting to the Archive 61
Navigating at the Archive 62
Obtaining the File 67
Previewing File Contents 68
Exiting the Archive 69
Suggested File Archives for Educational Use 69
Finding It With Archie 70
A Sample Search 71
Chapter 5 • Receiving and Uncompressing Files 75
ASCII (Standard) Text Files 76
Binary Files 76
Binary File Transfers 77
BinHex (.hqx) Files 78
Compressed Files 81

A Sample File Uncompression Sequence 83
Transferring the Uncompression Software 85
Downloading and Decrypting the Software 87
Viewing .gif Files in DOS 87
File Management Tips 88

Section 2 • Interpersonal Resources 89

Chapter 6 • Electronic Mail Services 91
Internet Address 91
The Message 92
Requesting Files by Electronic Mail 92
Electronic Teacher Contacts Lists 92
Transferring Files by Electronic Mail 94
The FTP Gateway 94
Archie by Electronic Mail 97
World Wide Web Pages by E-Mail 99

Chapter 7 • Internet-Based Discussion Groups 103
Listserv Groups 104
Listserv Subscription 104
Canceling Your Subscription 106
Other Kinds of Mailing Lists 108
Finding Mailing Lists of Interest 108
Network Newsgroups 109
Newsgroups for Educators 110
SCHLnet Newsgroups 112
Newsgroups via Gopher 113
Newsgroups Containing Mailing List Postings 114

Chapter 8 • Finding Folks on the Internet 115
Fingering Information 116
Interactive User Directories 119
An Asynchronous User Directory 121
Fingering Other Information 122

Section 3 • Educational Applications 127

Chapter 9 • Telecollaborative Educational Activities 129
Interpersonal Exchanges 130
Keypals 131
Global Classrooms 137

Electronic Appearances 141
Electronic Mentoring 142
Question-and-Answer Services 144
Impersonations 145
Information Collections 147
Information Exchanges 147
Database Creation 152
Electronic Publishing 157
Telefieldtrips 159
Pooled Data Analysis 163
Problem-Solving Projects 165
Information Searches 165
Electronic Process Writing 168
Sequential Creations 168
Parallel Problem Solving 170
Virtual Gatherings 173
Simulations 174
Social Action Projects 176
An Educational Telecomputing Archive 179
Chapter 10 • Teleresearch Activities 181
Promises and Caveats 182
Information vs. Knowledge 183
Manageable Miscellany? 184
Information-to-Knowledge Processes 187
Telehunting, Telegathering, and Teleharvesting 188
Information Seeking 188
Information Synthesis 190
Teleharvesting 194
References 195

Section 4 • Appendices 197
Appendix 1 • Recommended Gophers 199
Appendix 2 • Recommended World Wide Web Pages 209
Appendix 3 • Recommended Telnet Sites 233
Appendix 4 • Recommended FTP Archives 257
Appendix 5 • Recommended Mailing Lists 265
Index 285

Preface

This book is designed to assist your exploration of the network of networks (of networks, of networks...) called the Internet. My hope is that in 5 to 10 years, this book will no longer be necessary. By that time, software tools will be developed and distributed that will make Internet resources just "points and clicks" away; early versions of tools like these are presently in use on the Internet, including *Fetch*, *TurboGopher*, *Eudora*, *NewsWatcher*, and *Netscape*. At that time, this book will, perhaps, be relegated to a time capsule somewhere to remind future generations that networked information wasn't always so easy to obtain.

You may be wondering what the title of this book has to do with finding educational resources on the Internet. According to the *Academic American Encyclopedia* (published by Grolier Electronic Publishing, Inc., in 1993), searched online, of course, ferrets are a kind of domesticated weasel. They commonly are known for their superior, speedy hunting abilities, especially in the below-ground tunnel networks that other animals (such as prairie dogs) create. The word "ferret" and its derivatives (i.e., "ferret out") have been appropriated in the English language to indicate an active, persistent, careful, results-oriented hunting process, and to imply intelligence, cleverness, and expedience (Gove, 1986). The clever little ferret is an apt mascot for this book, which will help you with your own electronic ferreting on the Internet.

Audience

Many novice electronic explorers without the connections that support client-server software tools, such as *Netscape* and *TurboGopher*, have expressed a need for some assistance in "ferreting out" information on the Internet. Among that group, in ever-increasing and enthusiastic numbers, are precollege teachers. This book is written for them, and ultimately, for their students. It presents the fundamentals of "Internet roaming" in ways that I hope will be especially well suited to educators. It is intended to be read with a computer-and-modem hookup available to you and with the determination to explore and experiment with the different services presented in each chapter. As with many computer-mediated skills, the best way to learn it is to *try it*.

I assume several things about the readers of this book:

- that you have access to an Internet account that allows you to send and receive electronic mail (e-mail), participate in some sort of public computer conferencing activity, and, more importantly, use **telnet** and **ftp** commands, Gopher tools, and World Wide Web browsers to establish connections with other Internet sites
- that you have already hooked up a modem to your computer, have telephone line access, and know how to use a telecommunications package to log into your Internet account
- that you are comfortable and competent with the operation of a full-featured word processor, and know how to save word-processed files as text-only (or ASCII) files. This would imply that you are also comfortable enough with the operating system of your personal computer to boot programs easily and perform routine file management functions.

In other words, this book is not for the new computer user. If you are brand new to telecomputing, word processing, or your computer's operating system, please put this book aside temporarily. The International Society for Technology in Education's (ISTE) current *Resource Guide* (catalog) is a good place to look to find printed guides that will help you gain the prerequisite skills needed to use this book most effectively.

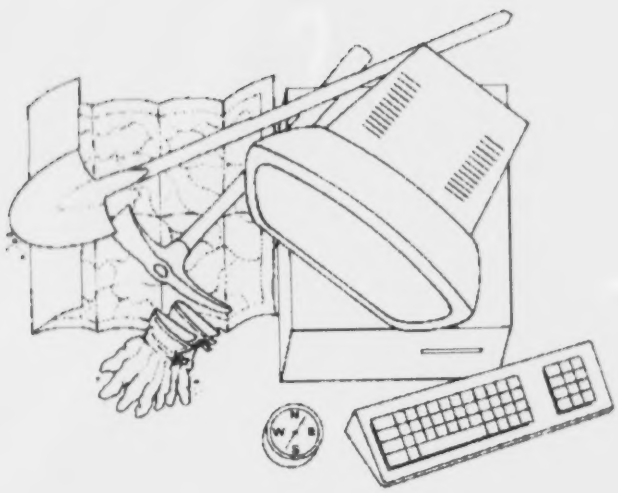
Conventions

This book uses the following conventions:

- Command names are printed in **bold**, for example, **telnet**, **ftp**, **gopher**.
- Material to be typed literally by the user is printed in **bold**, for example, **get magi10.txt**.

- Internet addresses are printed in **bold**, for example, **jbharris@tenet.edu**.
- Keystrokes to perform keyboard commands are encased within < >, for example, <Control> key or <Shift> key.
- File names are printed in *italic*, for example, *plrabn11.zip*.
- List and newsgroup names are printed in *italic*, for example, *KIDPROJ*, *EDTECH*, *k12.lang.art*.
- Computer software names are printed in *italic*, for example, *StuffIt*, *BinHex*.
- Names of programs available for use via your Internet account are printed with an initial capital, for example, Telnet, Archie, Gopher, Lynx.
- Variables or placeholders that the user will replace with an actual value are printed in *italic*, for example, **ftp** *hostname*, in which you would replace *hostname* with the address of some computer on the Internet.
- Examples of screen views, showing both computer output (plain) and text typed literally by the user (**bold**), are printed in nonproportional type and enclosed in boxes, for example,

```
prompt> ftp uiarchive.cso.uiuc.edu
```



Overview

What would you need to find buried treasure?

- a map
- tools to do the digging
- a container to transport what has been found
- a way to travel

What if that treasure were information, accessed electronically through a network of networks? Analogously, you would need:

- the locations of the electronic "treasure troves"
- the skills to access the different kinds of treasures at each electronic site
- ways to transfer the information that you acquired online to other documents
- an account that allows free exploration of the network

This book on "electronic ferreting" will help you to acquire the knowledge, skills, and experience necessary to locate and use informational and interpersonal resources found on the international network of networks known as the Internet. We will use the term "interpersonal resources" to represent those tools and services on the Internet that help people to exchange information with other people. Electronic mail, computer conferencing, and "chatting" tools are examples of interpersonal resources. We will use the term "informational resources" to represent those tool-assisted connections on the Internet that link people with electronic storehouses of information, such as databases and file archives. Most of this book will concentrate on the use of informational resources, such as Gophers, the World Wide Web, Telnet connections, and FTP archives.

Telecomputing Options

There are five basic types of information exchange possible on the Internet. Stated in terms of the types of connections that you can make, they are:

- person-to-person connections
- person-to-group connections
- person-to-computer program connections
- person-to-information archive connections
- person-to-any-of-the-above connections, made easier by simple-to-use software

These five different types of human connections are made possible on the Internet by five corresponding telecomputing options:

- electronic mail
- computer conferencing
- interactive Telnet sessions
- noninteractive file transfer protocol (FTP) sessions
- Gopher and World Wide Web sessions

Electronic Mail

E-mail, stated simply, is a text-based cross between a personal letter and a telephone message. In practice, you could use e-mail to share learning activity ideas with other teachers in other cities, states, or countries, or help your students share information for a project they are completing collaboratively with students in other locations. A brief review of this option is presented in Chapter 6.

Computer Conferencing

Computer conferencing (i.e., Usenet News on the Internet) is a text-based cross between a newspaper and an asynchronous town meeting. You could use computer conferencing to participate in a group discussion of current educational issues with other teachers with similar interests, help your students review and respond to other students' writing, or participate in a group simulation activity. Chapter 7 provides information about this option.

Interactive Telnet Sessions

Interactive Telnet sessions allow users to directly access programs running on remotely located computers, such as searchable databases of information. With interactive Telnet sessions, you and your students could search bibliographic, scientific, literary, or lesson-plan databases located on computers anywhere on the Internet. This option is explained in Chapter 3.

Noninteractive File Transfer Protocol (FTP) Sessions

FTP sessions allow users to access and copy files of information from remotely located computers. You and your students could acquire full-text versions of children's books, photographs taken on recent NASA missions, animated sequences representing patterns of molecular activity, or educational software in the public domain with these noninteractive file transfers. Chapter 4 outlines how to use this option. Chapter 5 describes how to download, uncompress, and decrypt files once they have been transferred.

Gopher and World Wide Web Sessions

Gopher tools, which provide menued selections of files from information archives and Telnet sites, can be used to simplify connection-making on the Internet. Gopherspace is organized hierarchically with menus and submenus. Chapter 1 discusses several Gopher tools useful for locating and acquiring Internetworked information.

The World Wide Web, an attempt to unify and simplify connections to *all* types of Internet resources, is a multimedia, hypertextual way to both access and publish Internetworked resources. Unlike Gopherspace, which has a standard way of organizing information, the Web allows each information provider to design the best way to present information to site visitors. Chapter 2 shows you how to use the Web.

Are you wondering how you can get access to this rich and voluminous variety of information? The first step in the process is to acquire an Internet account.

Acquiring an Internet Account

The Internet is actually a network of more than 80,000 computer networks, with many sites, or nodes, located at educational institutions. In late 1994, there were more than 13.5 million people in the world with access to the Internet, many of them associated with colleges and universities (MIDS, 1995). Of these, approximately 3%, or more than 400,000 users, are probably precollege teachers. The Internet appears to be doubling in size each year (Quarterman & Carl-Mitchell, 1995b). By the year 2000, there will be 3–5 million U.S. precollege students who use Internetworked resources and tools (Itzkan, 1994-95).

Gaining Access

Gaining access to the awe-inspiring array of interpersonal and informational resources on the Internet is as easy (or difficult) as acquiring a user account on a computer that has a distinct address. This could be a mainframe computer at a college within your local calling area, a minicomputer at a local university, or a powerful desktop computer, such as a Pentium PC, in your district's administration building. Although many elementary, middle, and secondary school educators with Internet access have accounts because of the generosity of local college and university computing personnel, increasing numbers gain entree through statewide or regional Internet-based educational networks, such as TENET in Texas and VaPEN in Virginia. The best way to acquire an Internet account is to first gather your patience, persistence, politeness, and persuasiveness. With these tools in hand, call a computing services representative with your request, beginning with the first office in the following list and moving through the options, in order, until you are successful.

- your school district's central administrative office
- your regional educational service center
- your state's department of education technology center
- university computing centers within your local calling area
- college computing centers within your local calling area
- scientific research centers within your local calling area
- Internet-connected commercial organizations accessible in your local calling area

Be sure to communicate your awareness that providing you, a precollege educator, with an Internet account, would be a much-appreciated favor on the part of the granting organization. Emphasize the many ways that you and your students could use the interpersonal and informational resources available on the Internet for powerful, forward-thinking teaching and learning in many disciplines.

An increasing number of commercial organizations are making Internet services available to clients. Although the prices for full access with no time limits are still probably more than most educators would want to pay ($200 or more per year), acquiring Internet services in this way may also be an option that you would like to consider.

Whether or not you can secure an account will probably depend upon whether there is a plan in your state to provide Internet access for precollege teachers and students. In addition, the interest and commitment of the administrators at the local college or university computing center to providing telecomputing facilities to the general community will influence their decision about your request. The important point to remember is that the Internet is organized around the fundamental idea that information should be exchanged without restriction in a free and open environment.

Costs

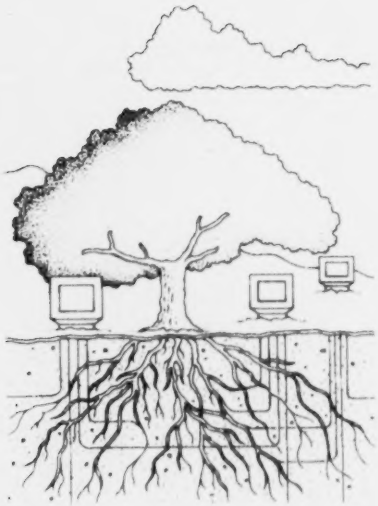
The question that arises in the minds of most educators at this point is "What will it cost?" The answer is "It depends." Individual sites pay a flat annual fee to the governing board of their regional portion of the Internet for access. This fee is based on the size of their user base, not the amount of network activity that their account holders generate. There are additional hardware, software, and maintenance costs (salaries for networking specialists, etc.) to the institution that vary according to the sophistication of the machines and connections that exist there. For most universities, colleges, and research centers, the additional cost of a few local teachers who use Internet resources is negligible, because these services are typically already provided for the faculty, and often staff and students on campus. However, large numbers of precollege school faculty wanting Internet access can tax already busy campus computer-based information systems and personnel.

Curriculum Ideas

Excellent examples of powerful ways in which telecomputing resources can serve as interactive learning tools in many different disciplines are discussed in Ellsworth's *Education on the Internet* (1994); Roberts, Blakeslee, Brown, and Lenk's *Integrating Telecommunications into Education* (1990); and Andres, Jacks, and Rogers' *TeleSensations: The Educators' Handbook to Instructional Computing* (1991). Even more infusion ideas can be collected from the Internet itself, through the use of electronic mail lists; newsgroups; education-oriented Telnet sites, such as NASA's Spacelink; education-related Gophers, such as the Armadillo; and FTP file transfers from electronic archives, such as the one provided by the Texas Center for Educational Technology. Chapter 9 provides 18 activity structures demonstrating how teachers and students around the world use telecommunications collaboratively for curriculum-based instruction. Chapter 10 discusses how to help students turn accessed information into knowledge.

Section 1

Informational Resources



Chapter 1
Gopher Tools

I once attended a concert here in Austin in the Texas Hill Country. Many of the seats were shaded by beautiful live oak trees. The trunks of these trees were so thick and the branch span so wide that I remarked to the friends sitting next to me how stunning these trees were. One of my friends told me live oak trees' roots are interconnected deep beneath the surface of the earth. This is why these trees appear in groups; they share nutrients, water, and even certain diseases through their collective root systems. Had I not happened to have this conversation with my friend, I would not now know a bit about the nature of live oak root systems.

Both of us were impressed by the powerful metaphor of these networked root systems. As I thought about the interconnectedness of all kinds of systems, including informational and interpersonal Internet resources, I realized how coincidental finding helpful information on the Internet can seem.

Because there are as yet no comprehensive directories that list all (or even most) Internetworked informational and interpersonal resources, locating helpful resources can occur through somewhat haphazard person-to-person connections. The information passes through distributed networks that are interconnected like the root systems of live oak trees. People with Internet accounts often post tips about favorite Internet-based resources on e-mail

discussion groups, newsgroups, or electronic bulletin boards. If you or your colleagues don't happen to follow those groups, you may be unaware of information that could be useful to you.

The folks at the University of Minnesota, McGill University, the University of Nevada, and Washington and Lee University have helped to make this process less haphazard. They have created user-friendly tools that can assist your searches of interconnected Internet domains to find specific information in ways other than by chance. These programmers have created, and freely share, tools called Gopher, Archie, Veronica, and Jughead.

In Chapter 4, I will discuss the information location tool called Archie. Archie, developed at McGill University, and now resident on many Gopher subdirectories, allows users to locate information in file archives on the Internet by file name. Archie tools can be accessed using Telnet commands (see Chapter 3 for more information on **telnet**ting), by accessing Gophers that list Archie as a menu option, or, if you have a direct, SLIP, or PPP connection to the Internet, by using special software, such as *Anarchie*. If you know part of the name of a file that you would like to locate and download (make a local copy to keep), and if that file is located on one of the several hundred FTP sites indexed, the Archie tool will help you find it.

If you do not know a part of a file name containing information that you need, then Veronica or Jughead (working in Gopherspace) can help you. This is possible because all of the internationally available Gophers are mutually accessible, each from and to the others, like the natural network of live oak tree roots.

Gopher

Gopherspace, a series of interconnected "electronic tunnels" for our Internet ferret to travel, is composed of many similarly constructed, friendly, menu-driven information organizers that will "go for" whatever information you tell them to seek, without your having to know specifically where they are going to get the material.

Gophers are actually multileveled menu systems that automatically make connections to Internet sites, such as file archives, databases, and other Gophers, to retrieve information that you request. Most Gopher sites on the Internet are directly accessible and open for public use. To use a Gopher to find information, your Internet account must either have Telnet capabilities or there must be a Gopher operating on the machine that houses your account. Most Internet service providers either house their own Gopher or make a popular one (such as the Gopher at the University of Minnesota, the "mother of all Gophers") available.

While online, you can read the textual information that the Gopher finds for you. If you would like an electronic copy to keep, there are two options. You can either save the information as a file in your Internet account space (if the Gopher is housed on the same computer system that makes your account available to you), or you can capture the information to a log file or session file with your telecommunications software. (The documentation for the telecommunications software that you are using to access your Internet account should tell you how to do this. Each telecommunications package helps you to do this slightly differently.) When a Gopher finds a nontext file for you, such as a graphic, a movie, or a sound file, you can save a copy of it to your account space, and like a text file saved in a similar way, you can download it to your personal computer later.

If you have a direct, SLIP, or PPP connection to the Internet, you can download any type of file directly to your hard drive or a floppy disk. To learn more about this way of using Gopher services, see Owen, Owston, and Dickie's *The Learning Highway: The High School and College Student's Guide to the Internet* (1995).

Getting to the Home Gopher

The best way to access your Internet provider's Gopher is either to choose an option from the main menu that is displayed when you log into your account or to type the command **gopher** at the system prompt. (The system prompt is the place where you can give commands to the computer that houses your account. Check with your Internet service provider if you don't know how to get there.) Once you are using your system's "Home Gopher," as it is sometimes called, you can connect to any other Gopher in the world by selecting options from a series of menus.

For example, when I type **gopher** at the system prompt in my account on TENET (the Texas Educational Network), I see this:

```
Internet Gopher Information Client v2.0.15

Home Gopher server: gopher.tenet.edu

→  1.  *Helpful Hints*
   2.  About the TENET gopher/
   3.  TENET Information/
   4.  The Texas Education Agency Gopher/
   5.  Texas State Government/
   6.  Education Servers/
   7.  Computer Lab/
   8.  Library/
   9.  Field Trips/
   10. College Bound/
   11. The World/
   12. Search TENET and World/
   13. Announcements: RFA's, Projects, Contests, etc/
   14. UNITE - Educator Employment Service/
   15. TENET Telecomputing Projects, incl MiniGrants/

Press ? for Help, q to Quit                          Page: 1/1
```

The slashes (/) at the end of most of the menu choices indicate that selecting that option will lead you to another menu, while question marks (?) indicate that those options connect you to queriable services. Such items often will allow you to type in keywords for searches within a limited set of information, such as "lots of places at the U of M" at the University of Minnesota's Gopher.

Making Choices

Selecting a menu option that ends in a slash will cause another menu of choices to be displayed. When I selected number 11, "The World," from TENET's Gopher's first menu, the following second-level menu was displayed. (Don't worry if your menus look slightly different from mine. Each Gopher site is organized a bit differently. Fortunately, the format is the same. And the Internet, including Gopherspace, is constantly changing.)

```
Internet Gopher Information Client v2.0.15

The World

→  1.  About this section
   2.  All Gophers in Texas/
   3.  All Gophers in World/
   4.  California Academy of Sciences/
   5.  E-Mail and Phone Searches/
   6.  Freenet Systems/
   7.  Government/
   8.  Grants and Funding/
   9.  NASA/
   10. NASA Spacelink <TEL>
   11. Subject Archives/
   12. Weather/

Press ? for Help, q to Quit, u to go up a menu                    Page: 1/1
```

Choosing option 3 from this second-level menu displays an impressive set of Gopher choices, organized primarily by geographic region.

```
Internet Gopher Information Client v2.0.15

All Gophers in World

→  1.  All the Gopher Servers in the World/
   2.  Search All the Gopher Servers in the World <?>
   3.  Search titles in Gopherspace using veronica/
   4.  Africa/
   5.  Asia/
   6.  Europe/
   7.  International Organizations/
   8.  Middle East/
   9.  North America/
   10. Pacific/
   11. Russia/
   12. South America/
   13. Terminal Based Information/
   14. WAIS Based Information/
   15. Gopher Server Registration <??>

Press ? for Help, q to Quit, u to go up a menu                    Page: 1/1
```

Because all of the Gophers reachable at this site are interconnected (like the live oak tree roots), by selecting menu items, you can travel to many other Gophers located throughout the Internet without having to know the specific addresses of these sites. These addresses are programmed into the Gopher software (sometimes called "Gopher pointing"), allowing these connections to be made automatically for you. (Do you see options 2 and 3 in the previous display box? These give us access to Veronica and Jughead, the Gopherspace searching tools that I mentioned earlier, and will review in more detail below.)

Menu choices can continue to be made until a document is displayed. For example, I found the following document, *101 Ways to Praise a Child*, on a

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Gopher in North America that holds messages that were posted during the past two years on LM_NET. LM_NET is an excellent electronic mail list for information specialists and teachers. (More details about electronic mail lists will be presented in Chapter 7.)

```
101 Ways to Praise a Child

WOW - WAY TO GO - SUPER - YOU'RE SPECIAL - OUTSTANDING - EXCELLENT - GREAT - GOOD - NEAT -
WELL DONE - REMARKABLE - I KNEW YOU COULD DO IT - I'M PROUD OF YOU - FANTASTIC - SUPER
START - NICE WORK - LOOKING GOOD - YOU'RE ON TOP OF IT - BEAUTIFUL - NOW YOU'RE CATCHING
ON - NOW YOU'VE GOT IT - YOU'RE INCREDIBLE - BRAVO - YOU'RE FANTASTIC - HURRAY FOR YOU -
YOU'RE ON TARGET - YOU'RE ON YOUR WAY - HOW NICE - HOW SMART - GOOD JOB - THAT'S
INCREDIBLE - HOT DOG - DYNAMITE - YOU'RE BEAUTIFUL - YOU'RE UNIQUE - NOTHING CAN STOP YOU
NOW - GOOD FOR YOU - I LIKE YOU - YOU'RE A WINNER - REMARKABLE JOB - BEAUTIFUL WORK -
SPECTACULAR - YOU'RE DARLING - YOU'RE PRECIOUS - GREAT DISCOVERY - YOU'VE DISCOVERED THE
SECRET - YOU FIGURED IT OUT - FANTASTIC JOB - HIP, HIP HURRAY - BINGO - MAGNIFICENT -
MARVELOUS - TERRIFIC - YOU'RE IMPORTANT - PHENOMENAL - YOU'RE SENSATIONAL - SUPER WORK -
CREATIVE JOB - SUPER JOB - FANTASTIC JOB - EXCEPTIONAL PERFORMANCE - YOU'RE A REAL TROOPER
- YOU ARE RESPONSIBLE - YOU ARE EXCITING - YOU LEARNER IT RIGHT - WHAT AN IMAGINATION -
WHAT A GOOD LISTENER - YOU ARE FUN - YOU ARE GROWING UP - YOU TRIED HARD - YOU CARE -
BEAUTIFUL SHARING - OUTSTANDING PERFORMANCE - YOU'RE A GOOD FRIEND - I TRUST YOU - YOU'RE
IMPORTANT - YOU MEAN A LOT TO ME - YOU MAKE ME HAPPY - YOU BELONG - YOU'VE GOT A FRIEND -
YOU MAKE ME LAUGH - YOU BRIGHTEN MY DAY - I RESPECT YOU - YOU MEAN THE WORLD TO ME -
THAT'S CORRECT - YOU'RE A JOY - YOU'RE A TREASURE - YOU'RE WONDERFUL - YOU'RE PERFECT -
AWESOME - A+ JOB - YOU'RE A-OK - MY BUDDY - YOU MADE MY DAY - THAT'S THE BEST - A BIG HUG
- A BIG KISS - SAY I LOVE YOU -

p.s. REMEMBER, A SMILE IS WORTH A THOUSAND WORDS

Credit: Dr. Don M. Small,
Executive Director, Indiana Association of Elementary School Principals
```

Once I finish reading a text document in Gopherspace, I can choose from several options:

```
Press <RETURN> to continue,
 <m> to mail, <D> to download, <s> to save, or <p> to print:
```

On most systems, at least two of these options will function reliably. Choosing **m** will allow you to **m**ail a copy of the document to someone (even yourself!), as long as you know their complete Internet address. (Chapter 6 has more information on Internet addressing.) Choosing **s** will allow you to **s**ave a copy of the document to your account's file space, so that you can download it to your personal computer later.

Gophering Remotely

On the few systems that do not house their own Gopher or automatically connect users to a large Gopher server, such as the University of Minnesota Gopher, if Telnet facilities are available, they can be used to connect to remotely located Gopher servers. For example, the Gopher at the University of California, Santa Cruz, can be accessed remotely by **telnet**ting to

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infoslug.ucsc.edu (or **128.114.143.25**) and entering **gopher** at the login: prompt. (Please see Chapter 3 for more information on Telnet connections.) The top-level menu that is displayed at that site looks something like this:

```
Internet Gopher Information Client v2.0.14

Welcome to InfoSlug at UC Santa Cruz

→  1.  About UCSC InfoSlug/
   2.  Index to the InfoSlug Menu Tree <?>
   3.  The Academic Divisions/
   4.  The Campus/
   5.  The Classroom/
   6.  The Community/
   7.  The Computer Center/
   8.  The Government/
   9.  The Library/
   10. The Researcher/
   11. The Student Center/
   12. The World/

Press ? for Help, q to Quit                          Page: 1/1
```

As you can see, there is a lot of information here. Please take a few minutes now to browse through some of what is accessible in Gopherspace.

Bookmarks

As you are wandering in Gopherspace, if you find some Gopher subdirectories to which you would like to return in the future, you can mark the locations by using a bookmark. When you are in the Gopherspace location that you would like to mark, type **a** (without pressing the <Return> key) to add a bookmark.

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For example, I found a wonderful collection of documents that comprise an "electronic field trip" to Antarctica. This collection of documents can be accessed through a Field Trips menu on TENET's Gopher.

```
Internet Gopher Information Client v2.0.15

Field Trips

    1.  About this section
    2.  DOS and Mac viewing software/
    3.  DOS and Mac listening software/
→   4.  Field trip to Antarctica, McMurdo Station/
    5.  Field trip to Craigdarroch Castle/
    6.  Field trip to Dallas Museum of Art/
    7.  Field trip to Hear famous historical figures speak/
    8.  Field trip to Mars/
    9.  Field trip to United Nations/
    10. Field trip to Vatican Exhibit at Library of Congress/
    11. Field trip with the International Arctic Project/

Press ? for Help, q to Quit, u to go up a menu                    Page: 1/1
```

The arrow is pointing to the menu option that I can use to access these documents. If I type an **a** now, this option becomes part of my bookmark collection. Gopher requests a name for this bookmark, and suggests one that might work.

```
Field Trips

    1.  About this section
    2.  DOS and Mac viewing software/
    3.  DOS and Mac listening software/
→   4.  Field trip to Antarctica, McMurdo Station/
+----------------Field trip to Antarctica, McMurdo Station----------------+
|                                                                         |
| Name for this bookmark:                                                 |
|                                                                         |
| Field trip to Antarctica, McMurdo Station                               |
|                                                                         |
| [Help: ^-]  [Cancel: ^G]                                                |
+-------------------------------------------------------------------------+
```


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I can either erase the suggestion and type in my own name or press the <Return> key to accept the suggestion. If I do the latter, then type **v** to view my entire list of bookmarks, I will see something like the following screen. Please note that the new bookmark is added to the end of the list of previously set bookmarks.

```
Internet Gopher Information Client v2.0.15

Bookmarks

→  1.  Armadillo, the Texas Studies Gopher/
   2.  Gopher Jewels/
   3.  Veronica search: whales/
   4.  Presentation and Reference Materials: Inet Society/
   5.  Field trip to Antarctica, McMurdo Station/

Press ? for Help, q to Quit, u to go up a menu                    Page: 1/1
```

Now that this is part of my bookmark list, whenever I want to access the virtual trip to McMurdo Station again, all I have to do is to **v**iew my bookmark list and select this particular previously created option. Therefore, as long as I retain this bookmark in my list, and as long as the pointer to this particular Gopher doesn't change, I don't have to remember how I found this document collection and retrace what could be many menu selections.

If I decide that a particular bookmark should no longer appear in my list, I can easily **v**iew the list, then **d**elete the unwanted item. To **d**elete a bookmark, type **d** when the arrow is pointing at the location that you no longer want included in your list of favorite Gopher places.

Your list of bookmarks will disappear when you disconnect from the Gopher unless it is a Gopher that resides on the same system that houses your Internet account. This is because when you **telnet** to any Internet site, you are essentially using the information at the site as an anonymous user. If you use a Gopher that is housed on the same system on which you have your Internet account, your bookmark list can be associated with your account's name, and therefore automatically saved after each Gopher session.

Getting to a Specific Gopher

Each Gopher on the Internet has a specific address. Gopher addresses are much like electronic mail addresses, minus the user information and the @ sign. For example, the address of the impressive University of Illinois College of Education Learning Resources Server Gopher is:

gopher.ed.uiuc.edu

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To reach this Gopher, I have to find a menu of all of the Gopher servers in the World, then choose those Gophers in North America, then select a list of Gophers in the U.S., then find the collection of Gophers in Illinois, then locate the Gophers at the University of Illinois, then (finally!) choose the Learning Resources Server. A much more efficient way to access this Gopher, though, is to connect directly to it. *As long as I know the correct address for this Gopher*, I can do that. At the system prompt in my Internet account, I can type:

```
prompt> gopher gopher.ed.uiuc.edu
```

Please note that the *command* **gopher** precedes the first part of the Gopher's address, which is also **gopher**. A space separates the command from the first six characters of an 18-character address, which contains no spaces.

Why not try connecting directly to some education-related Gophers now? There is a list of some of the best Gophers for precollege use in Appendix 1.

Veronica—Searches by Topic

When I selected option number 12 from UC Santa Cruz's "InfoSlug" main Gopher menu, I saw the following options.

```
Internet Gopher Information Client v2.0.14

The World

→  1.  Internet Assistance - Collected Resources via U.C. Irvine/
   2.  Other Internet Gopher Servers/
   3.  Other Internet Systems and Databases/
   4.  The Internet Hunt/
   5.  US State Department Travel Advisories/
   6.  Weather and More/
   7.  Wide Area Information Server (WAIS) databases/
   8.  Worldwide Internet Phone & Address Directories/

Press ? for Help, q to Quit, u to go up a menu                    Page: 1/1
```

On many such publicly accessible, large Gopher servers, choosing an option labeled something like "Other Internet Gopher Servers," such as option number 2 in the previous display, will lead you to another submenu that looks something like this:

```
Other Internet Gopher Servers

→  1.  Africa/
   2.  All the Gopher Servers in the World/
   3.  Asia/
   4.  California/
   5.  Europe/
   6.  International Organizations/
   7.  Jughead - Search High-Level Gopher Menus (via Washington & Lee) <?>
   8.  Library Gopher Menus and Servers/
   9.  Middle East/
   10. North America/
   11. Pacific/
   12. Russia/
   13. South America/
   14. Veronica search (UNR) of much of GopherSpace/
   15. Veronica search options and access (UMN)/
```

As you can see, this sub-submenu contains access points to many other Gophers located in many different places on the Internet. Although these might be tempting to explore, I'll suggest that we restrain ourselves for now, and instead, investigate two Gopher-related tools: Veronica and Jughead.

Veronica's Popularity

Gopher roaming is fascinating, but can be inefficient, especially when you need information quickly about a specific topic. If you or your colleagues have not happened upon that specific information in previous explorations of interconnected Gophers, it may take a long time to locate it. Veronica was designed to act as an electronic ferret, allowing you to search multiple Gophers simultaneously by topic. As such, it is potentially a very powerful tool, but its popularity makes its performance somewhat variable.

When I was first preparing this chapter for publication, the Veronica tool at the University of Minnesota's Gopher site was not functioning. I knew this because when I attempted to select the option that would allow me to work with Veronica, the screen froze with the following message in the lower right corner.

```
Connecting...
```

If the connection had been successful, I would have seen a series of characters just after the ellipsis: "/", "|", "\", and "—" displayed sequentially in the same space. This animation forms the illusion of a twirling stick. Because I did not see that image after waiting for a few minutes, I realized that the connection was

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not being made. I exited by holding down the <Control> key and pressing the **c** key once. (If this doesn't work, hold down the <Control> key and press the **z** key once. If that doesn't work, hold down the <Control> key and press the] key once. If the telnet> prompt appears, type **quit** to close the connection.)

The Internet's unpredictability has helped many of us learn to deal with such ambiguity. Knowing that Veronica is also online at:

infoslug.ucsc.edu

I **telnet**ted there and chose the two menu items in sequence that were demonstrated at the site stated previously. I then chose "Veronica search options and access (UMN)." The following menu was displayed:

```
Internet Gopher Information Client v2.0.14

Veronica search options and access (UMN)
→
  3.  Find GOPHER DIRECTORIES by Title word(s) (via NYSERNet    ) <?>
  4.  Find GOPHER DIRECTORIES by Title word(s) (via PSINet) <?>
  5.  Find GOPHER DIRECTORIES by Title word(s) (via SUNET) <?>
  6.  Find GOPHER DIRECTORIES by Title word(s) (via U. Nac. Autonoma .. <?>
  7.  Find GOPHER DIRECTORIES by Title word(s) (via UNINETT..of Bergen) <?>
  8.  Find GOPHER DIRECTORIES by Title word(s) (via University of Koe.. <?>
  9.  Frequently-Asked Questions (FAQ) about veronica - January 13, 1995
  10. How to Compose veronica Queries - June 23, 1994
  11. More veronica: Software, Index-Control Protocol, HTML Pages/
  12. Search GopherSpace by Title word(s) (via NYSERNet    ) <?>
  13. Search GopherSpace by Title word(s) (via PSINet) <?>
  14. Search GopherSpace by Title word(s) (via SUNET) <?>
  15. Search GopherSpace by Title wo.d(s) (via U. Nac. Autonoma de MX.. <?>
  16. Search GopherSpace by Title word(s) (via UNINETT/U. of Bergen) <?>
  17. Search GopherSpace by Title word(s) (via University of Koeln) <?>
  Simplified veronica chooses server - pick a search type:
  19. Simplified veronica: Find Gopher MENUS only <?>
  20. Simplified veronica: find ALL gopher types <?>

Press ? for Help, q to Quit, u to go up a menu                    Pages: 1 & 2
```

Items 12 through 17 allow users to search the words that comprise Gopher document titles and menus by keyword. If one of these options is selected, the tool called Veronica will be accessed at one of the six sites identified in parentheses. Veronica can help you to make broader Gopherspace searches than her cousin, Jughead, can.

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Veronica's power and ease of use makes her a very popular tool. Right now, there are relatively few sites that make Veronica's services available. When trying to access Veronica, you will often see a message displayed that looks something like this:

```
Search GopherSpace by Title word(s) (via NYSERNet   ): fox and grapes

→  1.  *** Too many connections - Try again soon. ***
```

If this happens to you, please take a deep breath and gather your patience. Usually, if you press the **u** key to go **up** a menu, and spend just a few minutes choosing Veronica programs at other sites until you can find one that is available for your search, you will be successful in accessing this powerful tool.

A Sample Search

Veronica allows users to search for information by topic and can understand simple Boolean operators (such as **and**, **or**, and **not**). The prompt that Veronica supplied when I selected option number 12 looked like this:

```
+---Find GOPHER DIRECTORIES by Title word(s) (via NYSERNet   )---+
|                                                                |
| Words to search for                                            |
|                                                                |
| ____________________________________________________________   |
|                                                                |
| [Help: ^_]  [Cancel: ^G]                                       |
+----------------------------------------------------------------+
```

Because I wanted to find a copy of the fable by Aesop about a fox and some grapes, this simple interface allowed me to type in **fox and grapes**, and when I pressed the <Return> key, Veronica searched all of the interconnected Gophers that were currently accessible from this particular site for document titles that contained the words "fox and grapes." After a few minutes, this search result was displayed on my screen.

```
Search GopherSpace by Title word(s) (via PSINet): fox and grapes

→  1.  The Fox and the Grapes
   2.  fox.and.grapes.txt
   3.  fox.and.grapes.txt        2368
   4.  fox.and.grapes.txt        2368
   5.  fox.and.grapes.txt
   6.  fox.and.grapes.txt
   7.  fox.and.grapes.txt
   8.  The Fox and the Grapes
```


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Selecting option number 1 from the search results menu displayed a shortened form of the text of the fable, as shown in the following example.

```
The Fox and the Grapes (0k)                                          100%
+------------------------------------------------------------------+
The Fox and the Grapes

A FAMISHED FOX saw some clusters of ripe black grapes hanging
from a trellised vine. She resorted to all her tricks to get at
them, but wearied herself in vain, for she could not reach them.
At last she turned away, hiding her disappointment and saying:
"The Grapes are sour, and not ripe as I thought."

+------------------------------------------------------------------+
[Help: ?]  [Exit: u]
```

Selecting option number 3 from the menu of search results showed a more lengthy version of the fable. The following is the first page of this document.

```
fox.and.grapes.txt     2368     (2k)                  53%
+------------------------------------------------------------------+
                FOX AND THE GRAPES

  Once upon a time... in a wood there lived a very crafty quick-witted fox. The rabbits,
rats, the birds and all the other creatures fled at the sight of him, for they all knew
how cruel and famished he was. And since his prey kept fearfully out of sight, the fox had
no choice but to haunt the neighbourhood buildings in the hope of finding something to
eat. The first time, he was in luck. Near a lonely peasant's cottage, only a low fence
stood between him and the hen run, and there he left death and destruction behind him.
  "What careless men, leaving such tender fat hens unguarded," he said to himself as he
trotted away, still munching.
  A few days later, hungry once more, he decided to visit the same hen run again. He crept
up to the fence. A thread of smoke curled from the cottage chimney, but all was quiet.
With a great bound, he leapt into the hen run. The cackling hens scattered, and the fox
was already clutching one in his jaws when a stone hit him on the side.
  "Wicked brute!" yelled a man waving a stick. "Now I've got you!"
  To make matters worse, up raced a large dog, snarling viciously. The fox dropped the hen
and tried to jump out of the hen run. At the first try, he
+------------------------------------------------------------------+
[Help: ?]  [Exit: u]  [PageDown: Space]
```

Please note, also, that selecting number 8 from the submenu yielded an error:

```
 The Fox and the Grapes (0k)                                         100%
+------------------------------------------------------------------+
0Server error:  '/Greinar/esop/data/ The Fox and the Grapes' does not exist!!
rror.host       1
```

This means that the Gopher program couldn't find the file that it was programmed to locate. This is probably because the file had been moved when the connecting site had reorganized its server, and the site that was providing the Gopher link to it had not yet updated the "pointer," or location information

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programmed into its online Gopher tool. Fortunately, as the search results show, several Gophers contain copies of files that will satisfy the search terms.

Jughead Searches for Gopher Directory Names

Items 3 through 8 on the InfoSlug's "Veronica search options" option allow users to search the words that comprise Gopher *menus* by keyword. If one of these options is selected, the program called Jughead will be accessed at one of these six sites. Jughead is a good tool to help you to find *collections* of information.

Going back up a menu (by typing the letter **u**), I selected option number 4, "Find GOPHER DIRECTORIES by Title word(s) (via PSINet) <?>," which allowed me to use Jughead. I searched for Gopher menu items that included the word "Aesop," and Jughead found 18 subdirectories.

```
Find GOPHER DIRECTORIES by Title word(s) (via PSINet): Aesop

→  1.  Aesop/
   2.  Aesop/
   3.  Aesop/
   4.  Aesop/
   5.  PZ8.2 .A254      -- Aesop's Fables/
   6.  Aesop's Fables/
   7.  Aesop's Fables/
   8.  Aesop's Fables/
   9.  PZ8.2 .A254      -- Aesop's Fables/
   10. Aesop               *DIR*    /
   11. Aesop               *DIR*    /
   12. Aesop/
   13. Aesop/
   14. Aesop/
   15. Aesop/
   16. Aesop/
   17. Aesop/
   18. Aesop's Fables :c4/
```

The subdirectory accessed by selecting option number 4 revealed three more menu choices from which I could select information on Aesop's fables, Aesop's life, or a preface to another document.

```
Aesop

→  1.  Fables
   2.  Life
   3.  Preface
```

Item 8 pointed directly to 17 pages of options that lead users to the fables themselves. The first page of these choices in early September 1995 looked like the following:

```
Aesop's Fables

→  1.  0
   2.  DRAFT OF 09-30-91
   3.  Hercules and the Wagoner
   4.  Jupiter and the Monkey
   5.  Jupiter, Neptune, Minerva, and Momus
   6.  LIFE OF AESOP
   7.  Mercury and the Sculptor
   8.  Mercury and the Workmen
   9.  The Aethiop
   10. The Ant and the Dove
   11. The Ants and the Grasshopper
   12. The Apes and the Two Travelers
   13. The Ass Carrying the Image
   14. The Ass and His Driver
   15. The Ass and His Masters
   16. The Ass and His Purchaser
   17. The Ass and His Shadow
   18. The Ass and the Charger

Press ? for Help, q to Quit, u to go up a menu                Page: 1/17
```

As you can see, both Veronica and Jughead are friendly, useful, and powerful—albeit popular, and therefore somewhat elusive—tools that lead us to helpful Internetworked informational resources.

Public Gopher Sites

Veronica, Jughead, and other searching tools can be used on anonymously accessible Gopher servers. Several of the more popular Gopher sites that offer use of at least one of these tools are listed here.

"Telnettable" Gopher Sites

Domain Name Address	I.P. Address	
infoslug.ucsc.edu	**128.114.143.25**	(login: **gopher**)
gopher.msu.edu	**35.8.2.61**	(login: **gopher**)
ux1.cso.uiuc.edu	**128.174.5.59**	(Password: **gopher** login: **gopher**)
inform.umd.edu	**128.8.10.29**	(login: **gopher** term type: **vt100**)

It is preferable, though, to connect to a Gopher that is housed on the system through which your Internet account is accessed. To check to see if your system has a Gopher of its own, type **gopher** at the system prompt.

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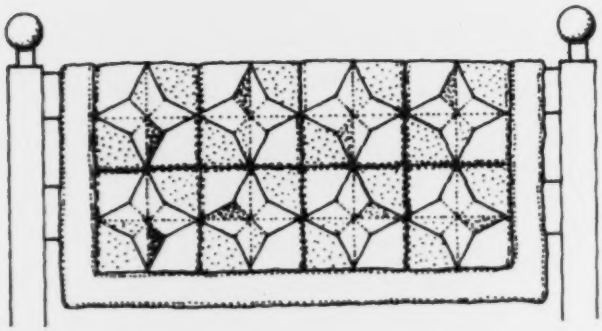
Although these tools behave similarly across sites, there are minor interface differences between sites. Each Gopher is customized according to the needs of its primary users. Each site can only accommodate a limited number of users at one time, so if one site will not respond when you attempt to connect to it, try another.

These tools can help you efficiently and expediently burrow through the endlessly interconnected and expanding domains of the Internet to ferret out the information that you need. Like the roots of the beautiful live oak trees in Austin, this ever-changing schematic of multileveled connections lends cooperative strength to the educational potential of global telecomputing networks.



Chapter 2
The World Wide Web

Do you know someone who makes quilts from scraps of material? My grandmother, like many others, made several such "crazy quilts," which became valued treasures for her descendants, for both their beauty and the stories that were woven into and around their composition. I remember one queen-sized quilt in particular that was formed as a series of concentric circles of stars. The stars were made from scraps of material that my grandmother had used to sew clothing for her children and grandchildren. One of my favorite things to do when I was in my grandmother's house as a child was to sit on the floor next to the bed that the quilt covered, with my mother and grandmother, and listen to their stories about the outfits that were represented as they pointed to each beautiful scrap-turned-star.

The Internet has a "crazy quilt" of its own, which brings together all of the different kinds of online resources available (e.g., file archives, remotely accessible databases, newsgroup discussions, and other Web pages) via word-processor-like documents. It is called the World Wide Web (also WWW or W3). Web documents, which can integrate text, graphics, sound, and motion, usually contain links to related Internet resources that users can select. In that way, information on the Web is organized hypertextually, rather than hierarchically, as is the case with Gopher tools. Links on Web pages are

indicated by underlined words or framed icons, as you can see in the following screen shot showing a portion of the Texas Education Network's World Wide Web top-level page, or "home page." (Each copy of a program used to navigate the Web, called a "browser," is configured by the user to automatically access a specified home page when it is opened. Since I do most of my Internet work from my account on TENET, the statewide K-12 network in Texas, I have my browsers set to access this page on startup.)

Learn about The Texas Education Network (TENET)

Travel from The TENET Central Station

Find files and programs in The TENET Vault

Get updates on The State Networking Project

Travel to The Texas Education Agency

Also see TENET Gopher and About TENET Web

Texas Education Network (TENET)
Please send additions and comments to web master@tenet.edu

Users activate the links to other Internet resources, such as file archives, interactive connections, Gophers, newsgroups, and WWW servers by selecting them with a mouse click or by pressing the <Enter> or <Return> key, depending upon the type of Web browser being used. A Web browser, such as *Netscape* or Lynx, is installed on either the host machine that provides Internet services or the user's hard drive, so that Web documents can be interactively accessed.

The structures of WWW documents are chosen by their designers, who are Internet travelers or "Internauts" like you and me. The structure of Gopher documents, by contrast, is predetermined by the Gopher software as a hierarchically organized set of menus and submenus (and sub-submenus...), as you saw in the last chapter. Therefore, WWW documents can look very different from each other. Consider, for example, the following WWW page for NASA's Spacelink, on which different links are accessible by selecting buttons or underlined phrases:

- Spacelink Public Electronic Library
  - About Spacelink
  - Educational Services
  - Instructional Materials
  - NASA News
  - NASA Overview
  - NASA Projects
  - Spacelink Frequently Asked Questions
  - Spacelink Hot Topics
  - Keyword Search the Spacelink Library
- Spacelink Teacher Resource Center
- Additional Resources

NASA Home Page

NASA Spacelink Administrator comments@spacelink.msfc.nasa.gov

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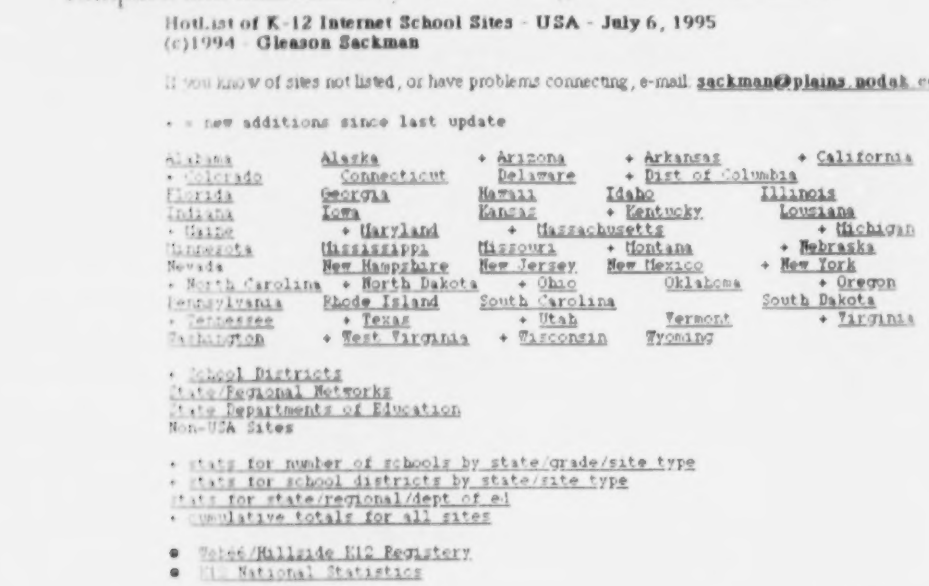
Then compare NASA's document with the proceeding W3 page that gives access to information about different countries when users select pictures of flags on a "clickable map" of Europe:

Web pages can even be organized much like Gopher pages, when it is appropriate to do so. The following example is an especially helpful index of WWW servers that are offered by K-12 schools, districts, and special programs, compiled and maintained by "Internet angel" Gleason Sackman:



HotList of K-12 Internet School Sites - USA - July 6, 1995
(c)1994 - **Gleason Sackman**

If you know of sites not listed, or have problems connecting, e-mail sackman@plains.nodak.edu

* = new additions since last update

Alabama	Alaska	* Arizona	* Arkansas	* California
* Colorado	Connecticut	Delaware	* Dist of Columbia	
Florida	Georgia	Hawaii	Idaho	Illinois
Indiana	Iowa	Kansas	* Kentucky	Louisiana
* Maine	* Maryland	* Massachusetts		* Michigan
Minnesota	Mississippi	Missouri	* Montana	* Nebraska
Nevada	New Hampshire	New Jersey	New Mexico	* New York
* North Carolina	* North Dakota	* Ohio	Oklahoma	* Oregon
Pennsylvania	Rhode Island	South Carolina		South Dakota
* Tennessee	* Texas	* Utah	Vermont	* Virginia
Washington	* West Virginia	* Wisconsin	Wyoming	

* School Districts
State/Regional Networks
State Departments of Education
Non-USA Sites

* stats for number of schools by state/grade/site type
* stats for school districts by state/site type
stats for state/regional/dept of ed
* cumulative totals for all sites

* Yahoo/Hillside K12 Registery
* U.S. National Statistics

What is most powerful about the World Wide Web? IMHO (that's "nettalk" for "in my humble opinion"), it is this flexibility of structure, the Web's ease of use, and (most importantly) the facility of WWW *publishing* that makes it such a potentially useful learning tool.

For more information on publishing WWW pages, you might want to look at Tittel & James' *HTML for Dummies*, published by IDG Books in 1995. HTML is an acronym for "hypertext markup language." It is the set of ASCII text formatting commands that make Web pages appear as they do when you access them with a browser program, such as *Netscape* or Lynx.

How to Get There

Perhaps you're wondering how to access the World Wide Web pages shown previously. Like any other Internet resource, the necessary piece of information is the address of the document. Web browsers expect this in the form of a URL, or "uniform resource locator." The URLs for the three sites in the preceding section are, in order of appearance:

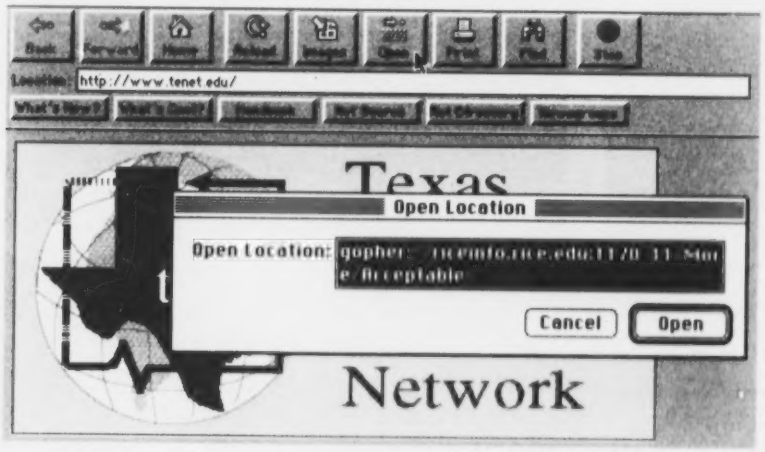
```
Location:    http://spacelink.msfc.nasa.gov/
```

```
Location:    http://s700.uminho.pt/europa.html
```

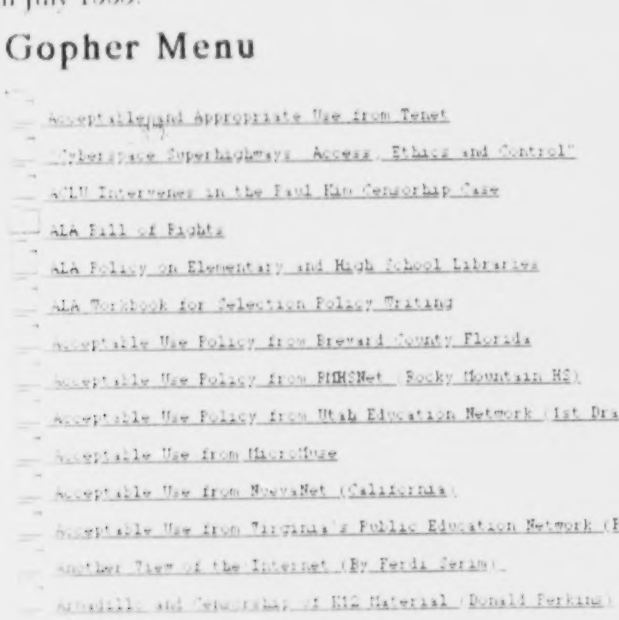

BEST COPY AVAILABLE

```
location:      http://www.sendit.nodak.edu/k12/
```

Notice that each of these addresses begins with the letters **http**. This indicates that the documents first encountered at these sites are Web pages, which use a type of information exchange called "hypertext transfer protocol." URLs can also help you to connect to other kinds of Internet resources. For example, if we wanted information on K-12 acceptable Internet use policies, we might visit the Armadillo Gopher, sponsored by the Houston Independent School District through the tireless efforts of its caretaker, Don Perkins. To reach the Armadillo using a WWW browser, we could **Open Location** or **Open URL** from either the browser's **File** menu, or a button, like the one in the following *Netscape* example, and type in the Armadillo Gopher's address:



Gophers, as viewed with multimedia WWW browsers, such as *Netscape*, have a rather uniform appearance. The first part of Armadillo's Gopher, which contains some of its available information on acceptable use, looked like the following in July 1995:


Gopher Menu
Acceptable and Appropriate Use from Telnet
"Cyberspace Superhighways: Access, Ethics and Control"
ACLU Interviews in the Paul Kan Censorship Case
ALA Bill of Rights
ALA Policy on Elementary and High School Libraries
ALA Workbook for Selection Policy Writers
Acceptable Use Policy from Broward County Florida
Acceptable Use Policy from RMHCNet (Rocky Mountain HS)
Acceptable Use Policy from Utah Education Network (1st Draft)
Acceptable Use from Microwave
Acceptable Use from NovaNet (California)
Acceptable Use from Tarzana's Public Education Network (PEN)
Another View of the Internet (By Paula Jerabek)
Armadillo and Censorship of HIV Material (Donald Perkins)

Notice that documents are represented by document icons, and submenus are pictured as folders. File archives (FTP sites) appear similarly via the Web, and interactive connections to remotely located executable programs (Telnet sites) are shown in ways that are almost identical to their format when they are accessed without the use of a Web browser. More information on FTP sites will appear in Chapters 4 and 5, while Telnet sites will be presented in Chapter 3.

The first part of the URL tells the browser the type of Internet resource you want to access. As you saw above, URLs for Gophers begin with **gopher://**. Other types of resources are prefaced with the following codes for exchange protocol or data source type.

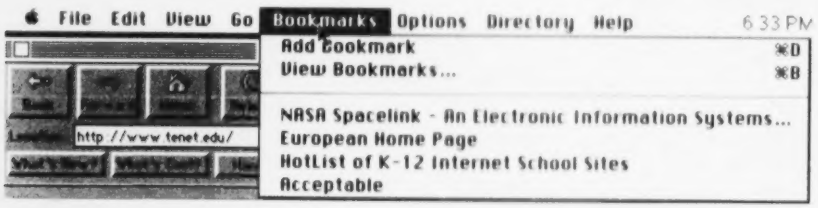
- **ftp://** — File archive (see Chapter 4)
- **telnet://** — Interactive connection (see Chapter 3)
- **news://** — Newsgroup/conference (see Chapter 7)
- **mailto://** — Electronic mail message (see Chapter 6)
- **WAIS://** — Wide Area Information Server (see Chapter 3)

There are literally millions of Internet sites available for your perusal. Once you locate some that will be helpful to you and/or your students in the future, how might you find them again, quickly and easily? Just like you did in Gopherspace.

WWW Bookmarks

All four of the sites that we have initially explored in this chapter are ones that are particularly helpful to K-12 educators interested in using Internet resources for teaching and learning. It is likely, therefore, that we might visit them multiple times, and for a range of different purposes. To do this, we could type in the URL each time that we want to connect to the page, or we could use a now-familiar tool (that is, assuming that you worked through Chapter 1 before you arrived here) to (book)mark the places to which we would like to return.

Bookmarks in *Netscape* are added, revised, and used from the **Bookmarks** menu (at the top of the screen).



As you can see by the page titles listed below the horizontal line in the menu shown in the previous screen shot, I **add**ed a bookmark for each of the four sites mentioned earlier in this chapter by selecting **Add Bookmark** (an option located above the line) while viewing the page to which I wanted to return easily later. The **View Bookmarks...** command allows me to revise, annotate, and remove bookmarks.

Bookmarks are especially useful for teachers who want their students to find Internetworked information to use in their studies, and would like to help them to locate this information quickly and efficiently. In this way, the use of bookmarks can help you to stretch and maximize productivity even with limited network access time during the school day.

WWW Searches

Remember Veronica and Jughead, the helpful, but too-popular tools that helped you to search Gopherspace for information on particular topics? The World Wide Web offers searching tools called "search engines" that allow similar, but notably different, functions.

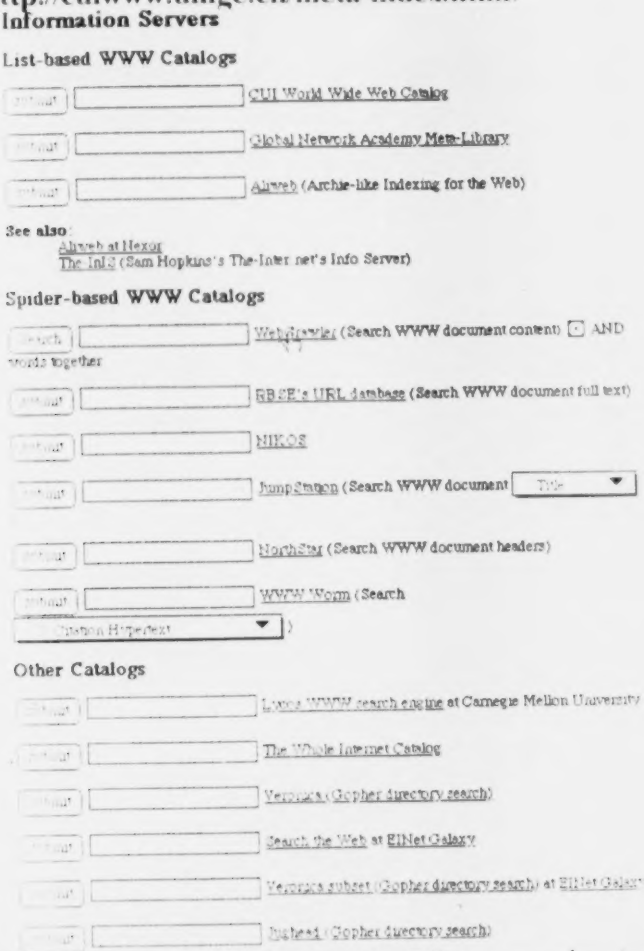
Collections of these different search engines can be found using the following URLs.

- **http://cuiwww.unige.ch/meta-index.html**
- **http://www.brandonu.ca/search.html**

- **http://www.syspac.com/srcheng.htm**
- **http://www.netrover.com/search.html**
- **http://www.selu.edu/www/search.html**
- **http://www.webnet.com.au/search_tools.html**
- **http://yucc.yorku.ca/home/thomas/search.html**
- **http://www.tenet.edu/search/main.html**

(Of course, these WWW pages are perfect candidates for your bookmark list!)

The following is just part of the index of different kinds of search engines located at **http://cuiwww.unige.ch/meta-index.html**:

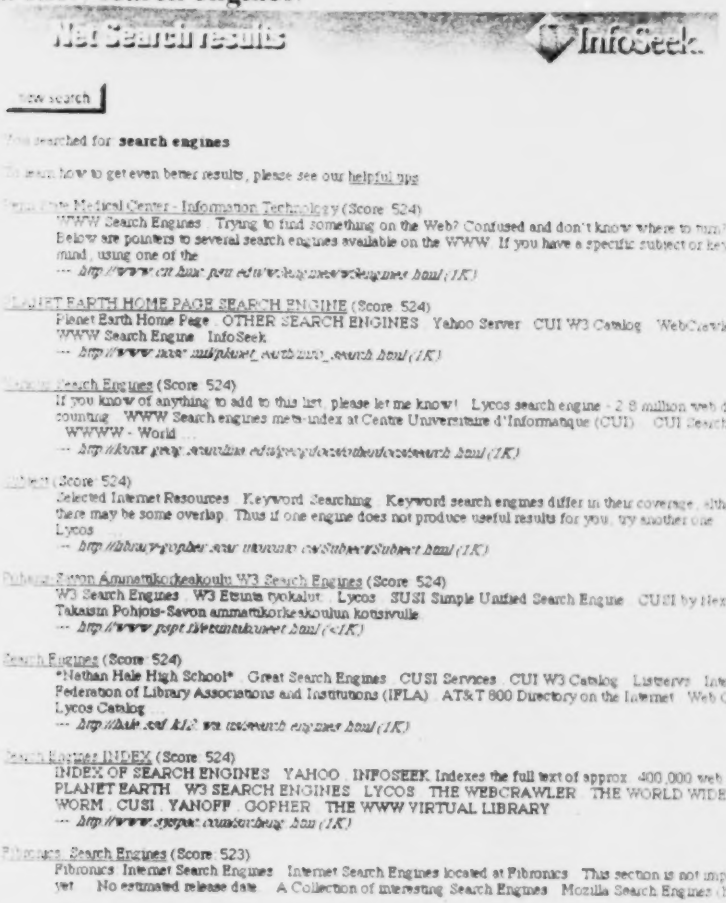

Information Servers
List-based WWW Catalogs
CUI World Wide Web Catalog
Global Network Academy Meta-Library
Aliweb (Archie-like Indexing for the Web)
See also:
Aliweb at Nexor
The InIS (Sam Hopkins's The-Inter net's Info Server)
Spider-based WWW Catalogs
WebCrawler (Search WWW document content) AND
words together
RBSE's URL dambase (Search WWW document full text)
NIKOS
JumpStation (Search WWW document
NorthStar (Search WWW document headers)
WWW Worm (Search
Other Catalogs
Lycos WWW search engine at Carnegie Mellon University
The Whole Internet Catalog
Veronica (Gopher directory search)
Search the Web at EINet Galaxy
Jughead (Gopher directory search)

World Wide Web searches of Web pages are full-text searches (compared to, for example, Veronica searches, which only review Gopher menu entries and document titles). They are also completed much more quickly than searches in Gopherspace (even when Veronica and Jughead searches are done via a Web

BEST COPY AVAILABLE 45

browser, rather than via a Gopher). Please understand, though, that different search engines will return different collections of information because each has a different index of W3 pages that it searches. Therefore, to find a maximally helpful set of Internet resources on any one topic, you should use several different search engines with the same keyword phrase.

The following shows the first few results of an InfoSeek search on the topic of (what else?) **search engines**:


Net Search Results

InfoSeek

new search

You searched for **search engines**

To learn how to get even better results, please see our helpful tips

Texas Tech Medical Center - Information Technology (Score: 524)
WWW Search Engines ... Trying to find something on the Web? Confused and don't know where to turn? Relax! Below are pointers to several search engines available on the WWW. If you have a specific subject or keyword in mind, using one of the ...
--- *http://www.ttuhsc.edu/it/webguide/searchengines.html (1K)*

PLANET EARTH HOME PAGE SEARCH ENGINE (Score: 524)
Planet Earth Home Page ... OTHER SEARCH ENGINES ... Yahoo Server ... CUI W3 Catalog ... WebCrawler ... Lycos ... WWW Search Engine ... InfoSeek ...
--- *http://www.nosc.mil/planet_earth/info_search.html (1K)*

Lycos: Search Engines (Score: 524)
If you know of anything to add to this list, please let me know! ... Lycos search engine - 2.8 million web docs and counting ... WWW Search engines meta-index at Centre Universitaire d'Informatique (CUI) ... CUI Search Engines ... WWWW - World ...
--- *http://lycos.cs.cmu.edu/lycos-eng/databases/search.html (1K)*

Subject (Score: 524)
Selected Internet Resources ... Keyword Searching ... Keyword search engines differ in their coverage, although there may be some overlap. Thus if one engine does not produce useful results for you, try another one. ... Yahoo ... Lycos ...
--- *http://library.vpubs.com/Internet/Subject.html (1K)*

Pohjois-Savon Ammattikorkeakoulu: W3 Search Engines (Score: 524)
W3 Search Engines ... W3 Etsinta työkalut ... Lycos ... SUSI Simple Unified Search Engine ... CUSI by Hexos ... Takaisin Pohjois-Savon ammattikorkeakoulun kotisivulle ...
--- *http://www.pspt.fi/tietotekniikka/w3.html (<1K)*

Search Engines (Score: 524)
"Nathan Hale High School" ... Great Search Engines ... CUSI Services ... CUI W3 Catalog ... Listserv ... International Federation of Library Associations and Institutions (IFLA) ... AT&T 800 Directory on the Internet ... Web Crawler ... Lycos Catalog ...
--- *http://hale.cod.k12.wa.us/research-engines.html (1K)*

Search Engines INDEX (Score: 524)
INDEX OF SEARCH ENGINES ... YAHOO ... INFOSEEK Indexes the full text of approx. 400,000 web pages ... PLANET EARTH ... W3 SEARCH ENGINES ... LYCOS ... THE WEBCRAWLER ... THE WORLD WIDE WEB WORM ... CUSI ... YANOFF ... GOPHER ... THE WWW VIRTUAL LIBRARY ...
--- *http://www.syspac.com/internet.html (1K)*

Fibronics: Search Engines (Score: 523)
Fibronics: Internet Search Engines ... Internet Search Engines located at Fibronics. This section is not implemented yet. ... No estimated release date. ... A Collection of interesting Search Engines ... Mozilla Search Engines (Netscape) ...
--- *http://www.fibronics.co.il/internet-engines.html (1K)*

Notice that each located resource is automatically presented as an underlined (and therefore active or "hot") link. That means that all one has to do is to click on the links to access the pointers that the search culled from the engine's index. And, if that located resource will be useful in the future, it can be bookmarked for easy access later. (Are you impressed yet?)

Text-Only Browsers—Lynx

At this point in the chapter, I should pause and confess an omission. There are two different types of World Wide Web browsers: those that display all types of information, including graphics, sound, and motion (which I call "multimedia

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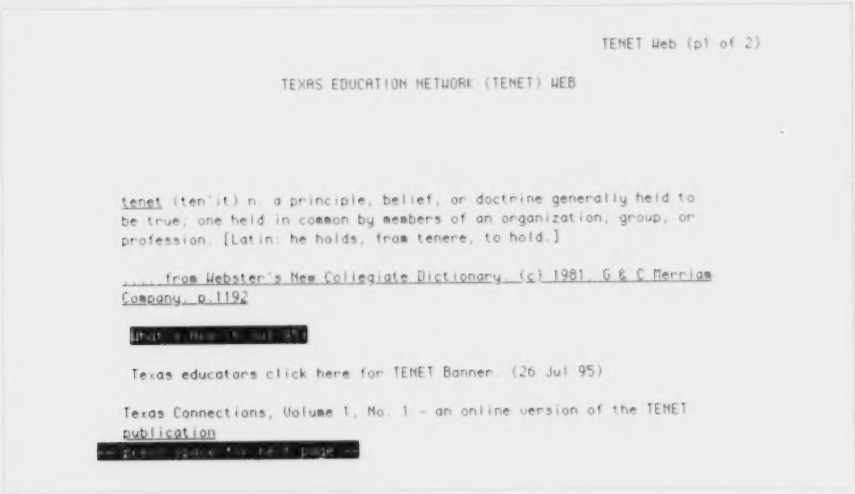
browsers"), and those that show only the text included on each Web page. I have been showing you the World Wide Web using *Netscape*, a multimedia browser. If you access your Internet account via a simple modem connection, you probably won't be able to use a multimedia browser for the time being. Instead, you will be able to view WWW pages using a text-only browser called *Lynx*. Lynx is probably available on the server that houses your Internet account, and therefore you should be able to use it once you log in.

Let's see what some of the pages depicted earlier in this chapter look like when viewed with Lynx. To access this browser program, either select a choice from a menu that leads you to it or go to the system prompt in your account (the place where you can give the host computer commands directly) and type **lynx**, then press the <Return> or <Enter> key.

```
system prompt> lynx
```

The default home page will then appear, in text-only format. The top section of TENET's home page, viewed through Lynx, looks like this:


TENET Web (p1 of 2)
TEXAS EDUCATION NETWORK (TENET) WEB
tenet (ten'it) n. a principle, belief, or doctrine generally held to be true; one held in common by members of an organization, group, or profession. [Latin: he holds, from tenere, to hold.]
... from Webster's New Collegiate Dictionary. (c) 1981, G & C Merriam Company, p.1192
Texas educators click here for TENET Banner. (26 Jul 95)
Texas Connections, Volume 1, No. 1 - an online version of the TENET publication

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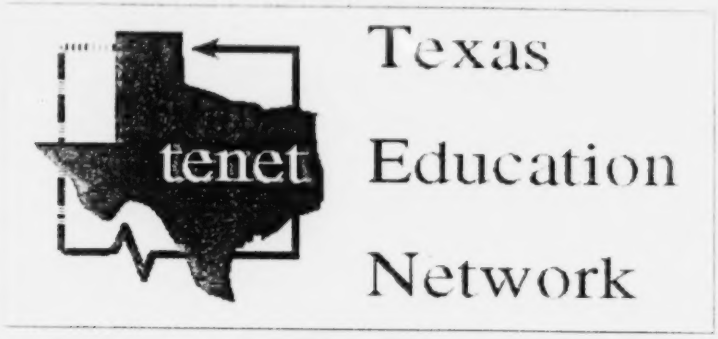
That same section, when viewed with a multimedia browser, looks like this:



tenet (ten'it) n. a principle, belief, or doctrine generally held to be true; one held in common by members of an organization, group, or profession. [Latin. he holds, from tenere, to hold.]

from Webster's New Collegiate Dictionary (c) 1981 G.& C.Merriam Company, p. 1192

What's New (6 Jul 95)

Texas educators click here for TENET Banner. (26 Jul 95)

Texas Connections, Volume 1, No. 1 - an online version of the TENET publication

Since Lynx shows only the text on each Web page, we don't see the TENET banner when we view the page with Lynx. On some WWW pages, however, wherever there are pictures displayed, Lynx has been programmed to show:

```
[IMAGE]
```

For example, the "clickable map" of Europe shown earlier, when displayed with Lynx, looks like this:

```
                                                    European Home Page (p1 of 2)

                                  EUROPEAN HOME PAGE


      This is a very simple European Map of WWW/NIR sites. Please click on
      any flag to go to the (sensitive map) Home Page of that country.
      If you don't have graphics support, here is [illegible] of sites
      organized by geography. If you want to see another european Home Page,
      try this one.

      Try the new Beautiful Cultural European Home Pages (with travel tips).

      [IMAGE]

   ___[IMAGE] EC Home Page      [IMAGE] World Home Page
```

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When that image is an icon that serves as a link to another Internet resource, like some of the options included on the TENET home page and displayed earlier in this chapter, Lynx might display the following instead:

```
[LINK]
```

Please note that these iconic links are still operational; they can be selected within a text-only browser and used to make connections to other Internet resources, just like the links that are programmed into the text displayed on WWW pages.

Navigating With Lynx

Do you see the highlighting on the words "What's New (6 Jul 95)" on the Lynx display of TENET's main screen? That corresponds to the first underlined link on the *Netscape* screen that follows it. That's how active links in Lynx are displayed. To browse through a page displayed with Lynx, folks usually use the <↑> (up arrow) and <↓> (down arrow) keys to advance from a possible link to the next possible link, pressing <Enter> or <Return> when they want the highlighted connection to be made. Links are often displayed in boldface with this browser.

Notice, also, that instead of using the mouse to move the scroll bar, as you would when using *Netscape*, Lynx users can move within a particular Web page by pressing the <Space Bar>, as indicated near the bottom of each Lynx display. As with other VT100-based online tools, Lynx requires that we use only keystrokes, rather than keystrokes and mouse movements, to explore.

Other helpful navigation commands in Lynx include:

- ← Go back to the previous Web page that you accessed.
- \+ Page down one screen in the document that you are viewing. (This is the same as pressing the <Space Bar>.)
- \- Page up one screen in the document that you are viewing. (You can do this by typing **b**, too.)

Opening URLs in Lynx

It's easy to visit other Web pages when using Lynx. As you can see if you look at the command options listed at the bottom of each screen (as shown in the following screen shot), typing **g** will allow you to **g**o to another Web page by supplying its URL. When you type **g**, a prompt appears:

```
URL to open:
  Arrow keys: Up and Down to move.  Right to follow a link; Left to go back.
 H)elp O)ptions P)rint G)o M)ain screen Q)uit /=search [delete]=history list
```

To tell Lynx to access another site online, just type the complete URL. Here, for example, I have typed the URL shown earlier that gets me to an index of K-12 schools in the United States that offer information via World Wide Web servers.

```
URL to open: http://www.sendit.nodak.edu/k12/
  Arrow keys: Up and Down to move.  Right to follow a link; Left to go back.
 H)elp O)ptions P)rint G)o M)ain screen Q)uit /=search [delete]=history list
```

As shown in the following, some Web pages look very similar when viewed with either text-only or multimedia browsers. Here is what Gleason's K-12 HotList looks like when viewed with Lynx. It was displayed with *Netscape* earlier in the chapter.

```
                                                HotList of K-12 Internet School Sites (p1 of 2)

    HotList of K-12 Internet School Sites - USA - July 6, 1995 (c)1994 -
    Gleason Sackman

    If you know of sites not listed, or have problems connecting, e-mail
    [illegible]
* = new additions since last update

Alabama          Alaska           * Arizona       * Arkansas        * California
* Colorado         Connecticut      Delaware        * Dist of Columbia
Florida          Georgia          Hawaii          Idaho             Illinois
Indiana          Iowa             Kansas          * Kentucky          Louisiana
* Maine            * Maryland         * Massachusetts                   * Michigan
Minnesota        Mississippi      Missouri        * Montana         * Nebraska
Nevada           New Hampshire    New Jersey      New Mexico        * New York
* North Carolina  * North Dakota     * Ohio            Oklahoma          * Oregon
Pennsylvania     Rhode Island     South Carolina                    South Dakota
* Tennessee        * Texas            * Utah            Vermont           * Virginia
Washington       * West Virginia  * Wisconsin     Wyoming

[illegible]
```

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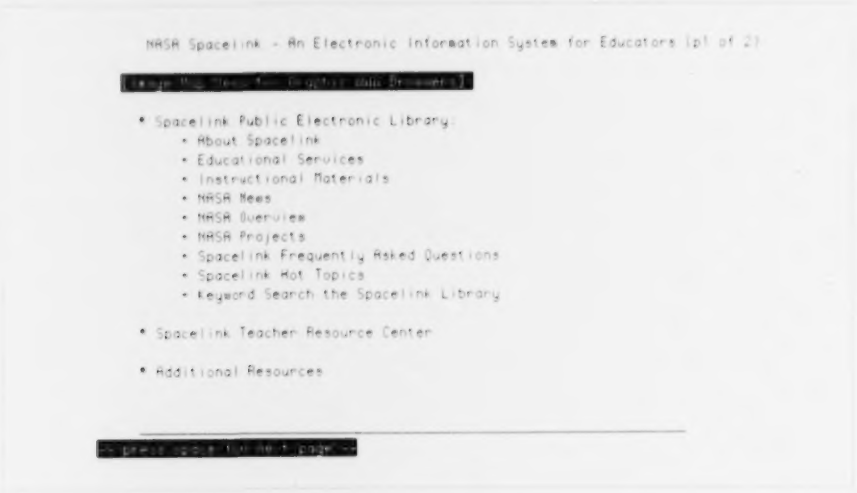
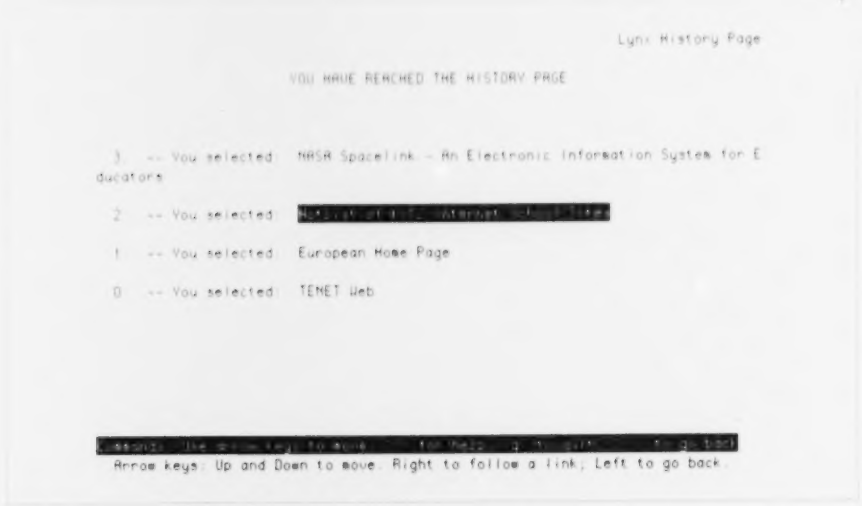
Some WWW sites, like NASA's Spacelink pictured earlier, appear very differently in text-only and multimedia modes.


NASA Spacelink - An Electronic Information System for Educators [p1 of 2]
* Spacelink Public Electronic Library:
• About Spacelink
• Educational Services
• Instructional Materials
• NASA News
• NASA Overview
• NASA Projects
• Spacelink Frequently Asked Questions
• Spacelink Hot Topics
• Keyword Search the Spacelink Library
* Spacelink Teacher Resource Center
* Additional Resources

(You might want to turn back a few pages in this book to see what this W3 page looks like in multimedia format.)

WWW browsers automatically keep records of which URLs you have accessed, and the order in which you have connected to them, during each session online. In Lynx, a "history page" of those connections can be displayed by pressing the <Delete> key.


Lynx History Page
YOU HAVE REACHED THE HISTORY PAGE
3 -- You selected: NASA Spacelink - An Electronic Information System for E
ducators
2 -- You selected:
1 -- You selected: European Home Page
0 -- You selected: TENET Web
Arrow keys: Up and Down to move. Right to follow a link; Left to go back.

The history page allows us to move freely among the past links we've made. In the previous example, if the user were to press the <Return> or <Enter> key, Lynx would take them from the Spacelink page to the index of K-12 WWW

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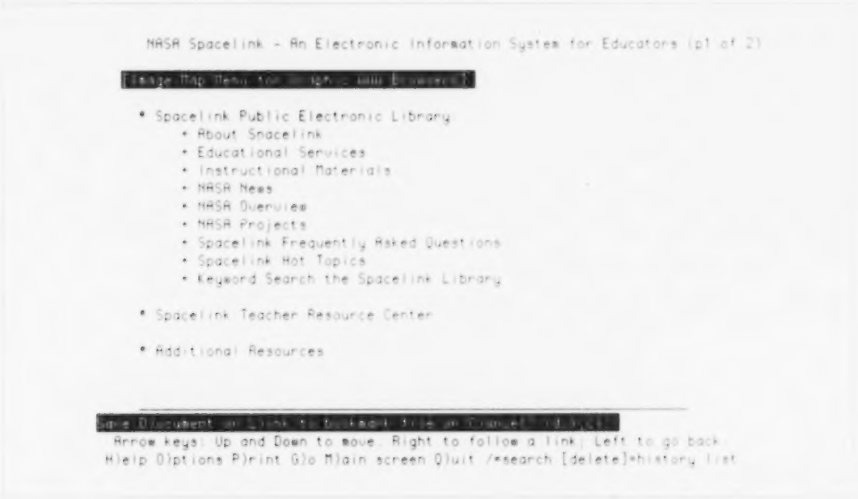
servers because that is the previously visited site name that is currently highlighted.

Saving Places and Files in Lynx

Remember how helpful bookmarks were in Gopherspace? As you saw earlier with *Netscape*, you can make them easily on the Web, too. Fortunately, if you use Lynx as your browser, two of the same commands that you used with Gopher will work similarly on the Web.

Let's say that you wanted to bookmark NASA's Spacelink site while using Lynx. You would connect to the home page for this service using the URL printed earlier (**http://spacelink.msfc.nasa.gov/**), and then type the letter **a** to add a bookmark to the list that is automatically and cumulatively kept in your Internet account space. You would then see:


NASA Spacelink - An Electronic Information System for Educators (p1 of 2)
[Image Map Menu for Graphic WWW Browsers]
* Spacelink Public Electronic Library
* About Spacelink
* Educational Services
* Instructional Materials
* NASA News
* NASA Overview
* NASA Projects
* Spacelink Frequently Asked Questions
* Spacelink Hot Topics
* Keyword Search the Spacelink Library
* Spacelink Teacher Resource Center
* Additional Resources
Arrow keys: Up and Down to move. Right to follow a link; Left to go back.
H)elp O)ptions P)rint G)o M)ain screen Q)uit /=search [delete]=history list

Please note the question printed at the bottom of the screen. Lynx wants to know whether you want to save the entire document location to your bookmark list, or just the link that is currently highlighted. (In this instance, that would be [Image Map Menu for Graphic WWW Browsers].) Since our example calls for the entire Spacelink page to be bookmarked, we would choose to type **d**.

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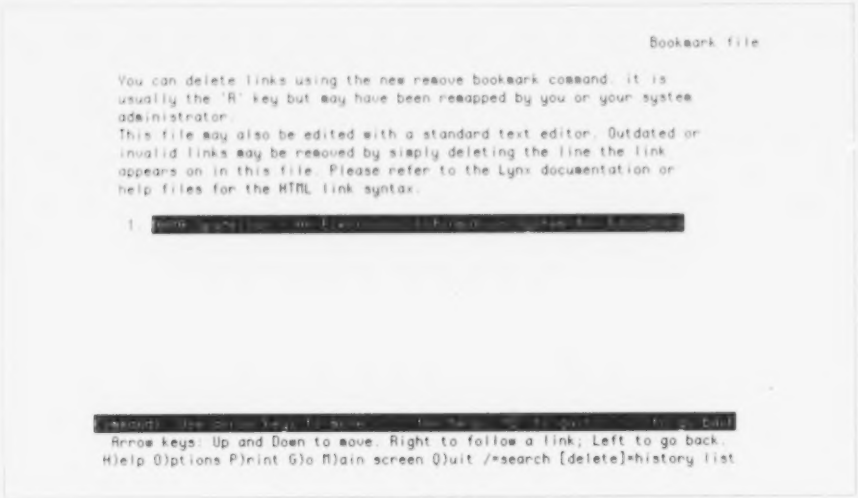
Once at least one bookmark has been added, the bookmark list can be viewed by typing the letter **v**.


Bookmark file
You can delete links using the new remove bookmark command: it is
usually the 'R' key but may have been remapped by you or your system
administrator.
This file may also be edited with a standard text editor. Outdated or
invalid links may be removed by simply deleting the line the link
appears on in this file. Please refer to the Lynx documentation or
help files for the HTML link syntax.
Arrow keys: Up and Down to move. Right to follow a link; Left to go back.
H)elp O)ptions P)rint G)o M)ain screen Q)uit /=search [delete]=history list

Bookmarks can be used to connect to the sites that they represent by highlighting them and pressing the <Return> or <Enter> key. They can be deleted by highlighting them and pressing the **r** key, as the on-screen directions suggest.

Lynx, like other WWW browsers, and like VT100 Gopher programs, also allows users to save, mail, and reprint (to the screen) the text of the Web page that is currently selected. These functions are all made available via the **p**rint command, which reveals the following screen of options:

Lynx Printing Options
PRINTING OPTIONS
There are 34 lines, or approximately 1 page, to print.
You have the following print choices
please select one:
Mail the file to yourself
Print to the screen

If the presently highlighted option were chosen, the user would be asked to supply a file name for the text on the current W3 page. That text would then be saved in a file, named as the user specified, and stored in the file space in the user's account. It would then be necessary for the user to download the file. (Please see Chapters 4 and 5 for more information on downloading.) If the "Mail the file to yourself" option were chosen, then the user would be asked to

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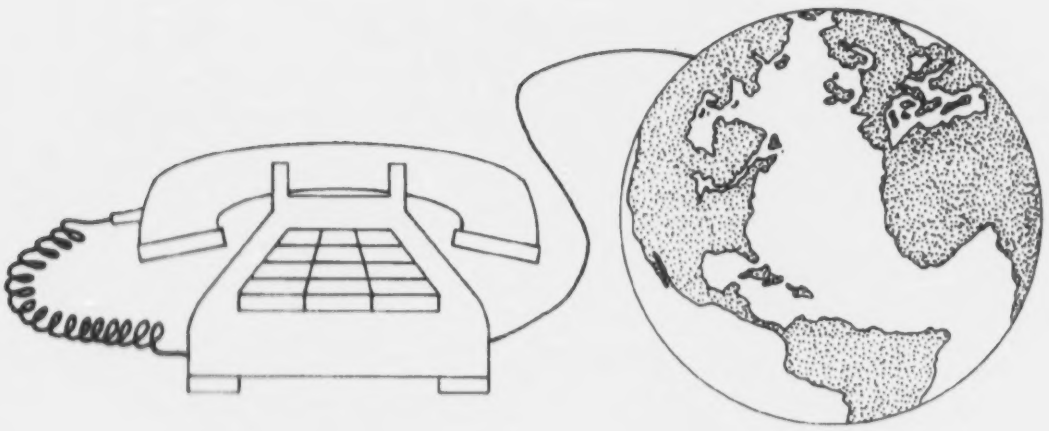
specify a valid Internet address, which Lynx could use to send the text of the currently selected page, as an electronic mail message, to the addressee. (Please see Chapter 6 for more on electronic mail.)

Multimedia vs. Text-Only Browsers

At this point, you may be saying to yourself, "Why would anyone ever choose to use a text-only browser when only multimedia software tools allow users to view pictures, hear corresponding sounds, and watch animated sequences on the Web?" Usually, text-only browsers are default choices, rather than active selections. To use a multimedia browser, your computer must either be directly connected to the Internet or use software supported by your Internet service provider that establishes a special kind of "simulated direct connection" called SLIP or PPP. At this point in time, the great majority of teachers and K-12 students using the Internet do not have access to a direct or a simulated direct connection. Therefore, for the next few years, most precollege teachers and students will probably access the World Wide Web using a text-only browser. Please know, though, that this is only a temporary pattern. Many schools are already providing upgraded connections to the Internet and many more will do so soon.

If you would like to learn more about these "point-and-click" Internet access tools and the connections that support them, you might want to read an excellent book that Trevor Owen, Ron Owston, and Cheryl Dickie published with Key Porter Books in early 1993 called, *The Learning Highway: The High School and College Student's Guide to the Internet*.

Please remember, though, that crazy quilts made with scraps of material from just one color scheme are just as warm and can be just as beautiful as those made with scraps that represent many more colors and patterns. Admirers of historic photographs might offer a similar reminder, urging us not to compare the products of different media to each other, but rather to appreciate the power and utility of each for itself.



Chapter 3
Interactive Telnet Sessions

The interactive Telnet session is a telecomputing option that allows users to directly access programs running on remotely located computers, such as searchable information databases. To understand how this works, please consider the following analogy. When you pick up a telephone and dial a number, you are establishing an interactive connection; the person or machine that you have accessed will respond to your voice or keypresses if they are available to do so at the time of your call. This type of realtime (simultaneous) telecommunications connection is usually based on sound—the human voice or the tones that are produced when telephone machine buttons are touched. Similar interactive connections can be made with text, the characters of which are translated to sounds when modems and standard telephone lines are used for telecomputing.

Telnet—Realtime Connections

Internet accounts that allow realtime interactive connections between computers enable us to use information and communications resources that are located anywhere on the Internet directly, much like making a (text-based) telephone call. For example, if we would like to read updates from NASA about recent space shuttle missions, we can establish a direct connection to NASA's Spacelink database, which is located in Alabama, and search its contents for the information that we desire. The magic in such text-based information access is that we can use the NASA database from Maine, Montana, Maryland,

Mississippi, or Manitoba, … using only a local telephone call or local network connection. This is possible, in part, because of:

- the existence of high-speed data transmission methods that join portions of the Internet together
- the interconnected nature of the many subnetworks on the Internet
- a standard protocol for high-volume information exchange supported by Internet sites called TCP/IP

The National Center for Supercomputer Applications at the University of Illinois wrote and freely distributes an online program called Telnet. Once installed on a mainframe, minicomputer, or workstation housing individual Internet accounts, the Telnet program enables realtime connections among the thousands of computers that are interconnected. This means that you and your students can search databases, participate in simulations, receive self-selected information, even chat with other people connected to the Internet. You simply access your account and use the Telnet program that is installed on the computer that houses it.

Using Telnet

A person-to-person or collect telephone call is a vocal connection made for you by a telephone operator. In a similar way, at most Internet nodes, your personal account must first be accessed with a username and password; then direct interaction with people or computer programs elsewhere on the Internet is possible.

Each Internet site makes interactive connections available in a slightly different way. At some Internet sites, open availability of Telnet facilities (without accessing individual accounts) is provided as soon as a connection to the local network is established. This is analogous to the telephone call that is dialed directly by you, rather than by the telephone operator. This reduces the demands on host computers in high-traffic local networks.

The Telnet Command

When using the **telnet** command, direct connections to resource sites are possible if you know their Internet addresses. Once you have logged into your account, you select a menu option labeled "Telnet" or access the operating system (Unix, VMS, etc.) of the host computer. Then you type the **telnet** or **open** command consisting of the word "telnet" or "open" followed by an address (e.g., **telnet 128.158.13.250** to connect to the Spacelink database).

In the same way that telephone numbers can contain country codes, area codes, local exchanges, and individual connection numbers, Internet addresses can

contain country codes, large domain names, node names, machine names, and port numbers. For example, Dartmouth College's College-Wide Information System (CWIS)'s Internet address is:

lib.dartmouth.edu

- **lib** is the name of the computer that hosts the system at Dartmouth
- **dartmouth** is the name of the regional node, or domain, on the Internet
- **edu** is the name of the section, or larger trailing domain on the Internet that is reserved for educational institutions

The University of Michigan offers an online version of the U.S. Weather Service. (Note that this Internet address has more components than the address for Dartmouth's CWIS.)

madlab.sprl.umich.edu 3000

- **madlab** is the name of the computer that hosts the service
- **sprl** is the name of the portion of UM's computer network in which **madlab** is located
- **umich** is the name of the regional domain on the Internet
- **edu** is the larger trailing domain for educational institutions
- **3000** is the number of the port through which the connection should take place

Each Internet address has alphabetic and numeric equivalents, much like local exchanges on telephone numbers. For example, a database of National Science Foundation publications called Science and Technology Information System (STIS) is available for interactive access by using either of the following Internet addresses:

stis.nsf.gov

128.150.195.83

Only a limited number of simultaneous access points, or ports, into each public Internet site are available. On occasion, when you attempt to make a connection, you may be told that access is not possible. This message may indicate that the site is currently hosting the maximum number of participants, or that upgrades to the interactive software are being made. As a result, the host computer is temporarily unavailable to you. In addition, as the number of remotely located users for each site increases, the directors for each service may have to limit access to the resources to prevent overburdening of the system. They may then decide to limit the connection time or provide a special access password to preselected users. These changes can occur at any time, so it is

important to be flexible in resource choice and patient with access procedures whenever making interactive connections on the Internet.

Telnet Resource Directories

Interconnected telephone networks offer local, regional, national, and international directory assistance in several forms, so that connections to people, places of business, and other organizations can be made easily. The Internet is relatively young, rather large, and growing rapidly. As a result, establishing and maintaining comprehensive resource directories for users is difficult. Although several white pages and yellow pages efforts are currently in beta-testing stages on the Internet, users learn about available resources mostly from other users.

Helpful Internet resource guides have been created to assist resource location and use. These guides are available by e-mail, FTP file transfer (see Chapters 4 and 5 for more information on FTP sessions), and/or surface mail to interested persons. The information itself is generally available free of charge unless it is part of a book that is for sale. Appendix 3 of this book lists many interactively accessible Internet resources that might be of interest to educators.

Single-Resource Telnet Sites

One telephone number can be used to contact a single person living alone, several roommates sharing an apartment, a family living in a common house, or a whole dormitory full of students. In an analogous way, one Telnet site may offer access to a single information source, a few related or unrelated resources, a family of services, or a host of different resource choices.

The following information is a sampling of open access single-resource interactive sites taken from the more extensive list included in Appendix 3 of this book. The sites included in this list may be of particular interest and utility in precollege classrooms and were selected to reflect the rich diversity of resources available to teachers and students.

Name: Weather Underground
Internet Address: **madlab.sprl.umich.edu 3000**
Brief Description: Complete online U.S. Weather Service.
Notes: Menu-driven and well-prompted; automatic login
Exit: Select: **X** from the main menu

Name: CHAT
Internet Address: **debra.dgbt.doc.ca 3000**
142.92.36.15 3000
Brief Description: Natural language interaction to learn about subjects, such as AIDS. Interactions are recorded by the developers for use in research. Comments are solicited at the end of each session. There are information files available on the following topics:

- AIDS (Acquired Immune Deficiency Syndrome)
- Epilepsy
- Alice (A simulated conversation)
- Maur (A simulated conversation with a dragon)
- Spectrum Management Program of Industry Canada
- Sex Education (1994 Loebner Prize Winner)

Notes: Login as **chat**
Exit: Type: **goodbye** and then answer the questions presented to you

Name: Spacelink
Internet Address: **128.158.13.250**
Brief Description: Database and interactive system containing information about NASA and NASA activities. Includes a large number of possible curricular activities for elementary and secondary science classes.
Notes: Login sequence:

When you see…	Type…
Username:	**newuser**
Password:	**newuser**

Exit: Select: **EXIT** from main menu

Name: MicroMuse
Internet Address: **michael.ai.mit.edu**
18.43.0.177
Brief Description: Virtual community that supports realtime conversations in a text-based microworld (virtual reality). Participants can explore this twenty-fourth-century science fiction environment, communicate with each other, or design their own space in the microworld.
Notes: Login sequence:

When you see…	Type…
login:	**guest**
MicroMuse…	**connect visitor**

Exit: Type: **QUIT**

Name: Martin Luther King, Jr. Bibliography
Internet Address: **forsythetn.stanford.edu**
36.172.0.41
Brief Description: "The MLK Bibliography lists approximately 2,700 bibliographic citations to works by or about Martin Luther King, Jr., and the civil rights movement. This bibliography was compiled by staff of the Martin Luther King, Jr. Papers Project, as a first step in preparing to publish King's works. It is intended to help both the student and the scholar traverse the rich and varied terrain of primary and secondary historical, sociological, and journalistic sources on King and the Black freedom struggle."
Notes: Login sequence:

When you see...	Type...
Account?	**socrates**
OK to proceed?	**y**
Type of terminal?	**VT100**
YOUR RESPONSE:	**select mlk**

Exit: Type: **END**

Resource Collection Sites

A television set is, in some ways, a mechanical vortex through which many different varieties of programs can be displayed. In your home or classroom, it serves as a gateway for shows of many types. To switch from program to program, you change the channel, either with a tool that is part of the television itself (such as a knob), or with a remote control device. Some interactively accessible sites on the Internet function similarly.

Your television set allows you to select from among several simultaneous program options by changing channels. As the viewer, knowing the origin point of a television program is unnecessary to watch the show. The same is true for Telnet information resource sites. As long as you know the correct Internet address and login procedure for the entry point to the resource, you can directly access it. Unlike a television program, interactive commands can be used to display only the information that you select from the resource site.

Depending on where you live and what type of entertainment service you have chosen, your television may receive 2, 12, 20, or 200 different channels. These channels are typically grouped into VHF, UHF, and cable types. Some Internet sites facilitate access to a group of services in an analogous way. In the same way that CNN's Headline News channel is accessed through a TV cable service that offers many programmatic choices, some Internet sites serve as electronic gateways, or connecting/translating points, to collections of other Internet sites. And unlike cable TV, most of these services are available all day every day. An "Internet TV Guide" with timing information is not necessary.

LIBS—Electronic Library Card Catalogs

An excellent example of such an information vortex on the Internet is LIBS, a gateway to many national and international electronic library card catalogs (and other services). LIBS is accessible through an Internet domain in Buffalo, New York. LIBS is organized according to information type, country, state, and institution, and operates with easy-to-use menus. With this powerful international indexing system, information sources available at local or remote libraries can be quickly and easily located. One can then obtain the information according to customary lending policies and interlibrary loans. LIBS also provides a simple and convenient way to check publication and availability information on books, journals, audiovisual media, and other resources.

If you wanted to use LIBS to access online library catalogs in Texas, for example, you would first **telnet** to **ubvmsb.cc.buffalo.edu** (or **telnet 128.205.100.3**). Once you typed **LIBS** at the Username: prompt, you would see something like the following screen.

```
LIBS - Internet Access Software v2.1
Mark Resmer, Sonoma State University, Mar 1995

On-line services available through the Internet:

    1.  United States Library Catalogs
    2.  Library Catalogs in other countries
    3.  Campus-wide Information Systems
    4.  Databases and Information Services
    5.  Wide-area Information Services
    6.  Free-Net s
    7.  Information for first time users

Press RETURN alone to exit now or
press Control-C Q <return> to exit at any time

Enter the number of your choice:
```

Because Texas is in the United States, you would choose option 1. Then you would see a screen that lists all states in which there are libraries with Internet-accessible online catalogs. In September 1995, there were libraries available in 42 states. Having subsequently selected Texas as the state for which to display library options, you would see a screen listing the 13 universities in Texas with online libraries that were accessible via this multiple-resource site.

Once you select one of these 13 options, the LIBS program will automatically **telnet** to the corresponding Internet address, thereby establishing a direct, interactive connection with that university's library catalog.

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Other Resource Collection Sites

Two other large resource collection sites, the National Public Telecomputing Network's Cleveland Freenet and the Washington University's WorldWindow gateway, have remarkable potential for supporting a diverse menu of information entrees in precollege classrooms.

Name: Cleveland Freenet
Internet Address: **freenet-in-a.cwru.edu**
freenet-in-b.cwru.edu
freenet-in-c.cwru.edu

Brief Description: The "flagship" of the National Public Telecommunications Network, which provides free, unlimited, and easy access to information of many different types, organized for general community use.

Notes: Automatic login; no username is needed. This is a *very* busy site; it is often difficult to access for that reason. Other freenets are listed in Appendix 3.

See especially Academy One, dedicated to use by teachers and students in primary and secondary schools interested in collaborative project work via computer-mediated telecommunications. Other information sources, such as a database of Supreme Court decisions, a pediatric illness database, and a collection of full-text historical documents, such as the Magna Carta and the Treaty with the Iroquois Nation, are also valuable for use in educational settings.

Exit: Type: **x**

Name: WorldWindow (Washington U. in St. Louis)
Internet Address: **library.wustl.edu**
128.252.173.4

Brief Description: Offers connections to a large number of Internet services, including NASA databases of space mission information and space science lesson plans for grades 1-12; the Science and Technology Information System (STIS); CompuServe access; daily local, national, and international weather forecasts; and realtime chess games. Probably the largest of the "cornucopia sites."

Notes: Login sequence:

When you see . . .	Type . . .
TERM =	Press the <Return> key

Exit: Type: **q** to quit

Wide Area Information Server (WAIS)

The software at each of the preceding collection sites helps you to make connections to online resources one at a time. An exciting form of information vortex called a "Wide Area Information Server," or WAIS, allows you to search for data across several information sources almost simultaneously. WAIS programs are being tested at several different sites on the Internet. They can be accessed with a **telnet** command as illustrated in this section, via Gopher services (see Chapter 1), or with special client-server software.

To show how powerful this kind of telecomputing can be, let's suppose that you are interested in developing a unit on the growth of democracy in the Commonwealth of Independent States before *peristroika*. You might search for information at a WAIS site accessed by **telnet**ting to **quake.think.com** and using the login code **wais**.

This WAIS site has more than 500 different information sources available for nearly simultaneous searching. One of the most powerful aspects of using a WAIS is the interdisciplinary nature of the information that can be located. Such searching capability allows you to learn about how democracy was and wasn't expressed in the Soviet Union by reading entries from many different types of information sources—even the poetry that was written by Soviet citizens. Therefore, you must first select the information sources at **quake.think.com** that you want to search.

To do this, you can page or search through the screens of information servers, selecting each that you would like WAIS to search for you by highlighting the server's name and pressing the <Space Bar>. However, there is an easier way to do this. WAIS has a *directory-of-servers* option that you can use to find the servers with information about the topic for which you need information.

To use this feature, you must first enter keywords that refer to the general types of information that you wish to locate. Let's assume that you would like news, information on education, historical information, and poetry, along with any information specifically about Russia or the former Soviet Union. You might, therefore, use the keywords *news*, *education*, *history*, *poetry*, *Soviet*, and *Russia* to search the *directory-of-servers* for appropriate information resources. To enter this first set of keywords, first select the *directory-of-servers*, then press the **w** key, then type the keywords, separated by single spaces, after the Keywords: prompt appears on the screen. When you press the <Return> key, WAIS will search through its list of more than 500 online information resources to find those that contain information on any of these general topics.

```
SWAIS                    Source Selection                  Sources: 549
  #             Server                    Source                    Cost
199:   [    wais.digital.com]       Digital-All                      Free
200:   [    wais.digital.com]       Digital-Customer-Update          Free
201:   [    wais.digital.com]       Digital-DTJ                      Free
202:   [    wais.digital.com]       Digital-SPD                      Free
203:   [cicg-communication.g]       directory-grenet-fr              Free
204:   [       irit.irit.fr]        directory-irit-fr                Free
205: * [     quake.think.com]       directory-of-servers             Free
206:   [      zenon.inria.fr]       directory-zenon-inria-fr         Free
207:   [      zenon.inria.fr]       disco-mm-zenon-inria-fr          Free
208:   [     munin.ub2.lu.se]       dit-library                      Free
209:   [       doccenter.com]       document_center_catalog          Free
210:   [  dewey.tis.inel.gov]       DOE-Interpretations-Guide        Free
211:   [romana.crystal.pnl.g]       doe_training                     Free
212:   [    fox.ensemble.com]       dowvision                        Free
213:   [bruno.cs.colorado.ed]       dynamic-archie                   Free
214:   [bruno.cs.colorado.ed]       dynamic-netfind                  Free
215:   [  wais.wu-wien.ac.at]       earlym-l                         Free
216:   [     db.internic.net]       ecat-library                     Free

Keywords: news education history Soviet Russia

<space> selects, w for keywords, arrows move, <return> searches, q quits, or ?
```


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When I searched WAIS in this way in early 1994, it found 40 sources, the first 18 of which were displayed on my screen. I could move down the list of sources with the arrow key, or by typing source numbers and pressing the <Return> key.

```
SWAIS                    Search Results                    Items: 40
#      Score          Title                              Lines
001:   [1000]  ANU-Australia-NZ-History-                  71
002:   [ 815]  michnet-news                               26
003:   [ 778]  POETRY-index                               28
004:   [ 704]  higher-education-software                  64
005:   [ 704]  matrix_news                                46
006:   [ 667]  poetry                                     18
007:   [ 630]  agricultural-market-news                   23
008:   [ 630]  news-conf                                  14
009:   [ 593]  REBASE_news                                18
010:   [ 593]  Tantric-News                               120
011:   [ 593]  news.answers-faqs                          18
012:   [ 556]  macintosh-news                             13
013:   [ 519]  ANU-Philippine-Studies                     92
014:   [ 519]  ciasites                                   54
015:   [ 519]  cool-waac                                  67
016:   [ 481]  ANU-Australian-Economics                   99
017:   [ 481]  ANU-Pacific-Relations                      90
018:   [ 481]  jte                                        31

<space> selects, arrows move, w for keywords, s for sources, ? for help
```

Notice that some of the information source names are self-explanatory as to their contents (i.e., higher-education-software) and others require some playful exploration to determine if they can be used to access desired information (i.e., jte, which is the *Journal of Technology Education*). Brief descriptions of most of the information sources can be obtained by moving the highlighting bar to the source's line on the screen and pressing the <Return> key.

After browsing through the list for a few minutes, I decided to search the source called *poetry*, which is a poetry database. To tell the WAIS program that I would like to search the poetry database for information, I moved the highlighted bar to the *poetry* line, then typed the letter **u** so that WAIS would later use this resource. WAIS told me that it had earmarked the poetry database for later use in a series of messages that were displayed at the bottom of the screen. I earmarked the POETRY-index, ANU-Theses-Abstracts, and ERIC-archive resources in a similar way.

To see the list of all information sources earmarked, I pressed the **s** key, as instructed by the directions appearing at the bottom of the screen. The following list was displayed.

```
001:  [  coombs.anu.edu.au]    ANU-Theses-Abstracts      $0.00/minute
002: *[   quake.think.com]     directory-of-servers      Free
003:  [    nic.sura.net]       ERIC-archive              Free
004:  [  sunsite.unc.edu]      POETRY-index              Free
005:  [microworld.media.mit]   poetry                    Free
```

Notice that the *directory-of-servers* was still the only information resource selected (as indicated by the asterisk next to its resource number). That implies that to search the four information sources that I earmarked from the list of 40, the *directory-of-servers* must be deselected, and the remaining four selected. This can be done by moving the highlighting bar to each line and pressing the <Space Bar> to either remove or display the asterisk.

Now that I had selected four information sources to search, I followed the directions at the bottom of the screen, and typed a **w** to receive a prompt that would allow me to enter my search terms. This time, the keywords that I typed referred to the specific information wanted, rather than the general types of information resources to be located.

```
Keywords: democracy Soviet Russia

Enter keywords with spaces between them; <return> to search; ^C to cancel
```

I typed the words that described the information that I wanted (**democracy Soviet Russia**), and in less than a minute, WAIS returned a list of 16 articles located that dealt with my topic.

```
SWAIS                    Search Results                    Items: 16
#      Score   Source          Title                                  Lines
001:  [1000]  (   POETRY)      Osip Mandelstam(bio by Bill Gilson)    40
003:  [ 750]  (   POETRY)      In the Gloaming   C                    44
004:  [ 750]  (   POETRY)      Ezra Pound  (bio by Bill Gilson)       3
005:  [ 750]  (   POETRY)      M'ANDREW'S HYMN                        Rudy
006:  [ 156]  ( ERIC-archive)  Title: Teaching the Responsibilities of  362
007:  [ 120]  ( ERIC-archive)  Title: Civic Education in Schools. ERIC  334
008:  [ 108]  ( ERIC-archive)  Title: High School Government Textbooks  307
009:  [ 108]  ( ERIC-archive)  Title: Renewing Civic Capacity: Preparin  250
010:  [ 108]  ( ERIC-archive)  Title: Social Studies Curriculum Reform   284
011:  [  96]  ( ERIC-archive)  Title: Teaching about Inner Asia. ERIC D  340
012:  [  72]  ( ERIC-archive)  Title: Social Studies for the 21st Centu  321
013:  [  60]  ( ERIC-archive)  Title: Law-Related Education in Elementa  325
014:  [  48]  ( ERIC-archive)  Title: Teaching the Federalist Papers. E  260
015:  [   0]  ( POETRY-index)  Search produced no result. Here's the Ca  3111
016:  [   0]  (ANU-Theses-Abst  Search produced no result. Here's the Ca  366
```


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WAIS found articles from two of the four sites in my list that discussed democracy or Russia or something referred to as Soviet. I could see any of these by simply typing the article number from the menu and pressing the <Return> key. For example, a biography of Osip Mandelstam, a Russian poet who was persecuted by the Stalinist government for views that he publicly stated on freedom of expression, had been located in the poetry database that WAIS had searched.

```
SWAIS                          Document Display                          Page: 1

Osip Mandelstam   (bio by Bill Gilson)
(1891 - 1938)


Osip Mandelstam was born in Warsaw but grew up in St. Petersburg (now Leningrad), then the
capital of crarist Russia. The son of a leather merchant and a cultured, music-loving
mother, Mandelstam was sent for his secondary education to the intellectually elite
Tenishev School in St. Petersburg, where he spent eight years, finishing when he was 17.
He then went to Europe, traveling and studying in Germany, Switzerland, Italy and France.
Mandelstam's poems first appeared in magazines when he was 19 and his first book, Stone,
came out in 1913 when he was 22. This was during a period when Symbolism - a European-
influenced poetry of mystical evocation and allusiveness which had predominated in Russia
since the 1890s - was being challenged by Acmeism, which stressed spare, graphic
delineation and eschewed the exotic; Mandelstam was early seen as one of the most
promising poets of the new group. But the following decades utterly changed the context of
such rivalries. The revolution of 1917, coming

Press any key to continue,  q  to quit.
```

As you can see, there is a veritable feast of information directly and interactively accessible with Telnet connections. Sample some of these electronic delicacies online before going on to the next chapter. The ferret, after all, needs some nourishment if it is going to continue to play on the Internet.

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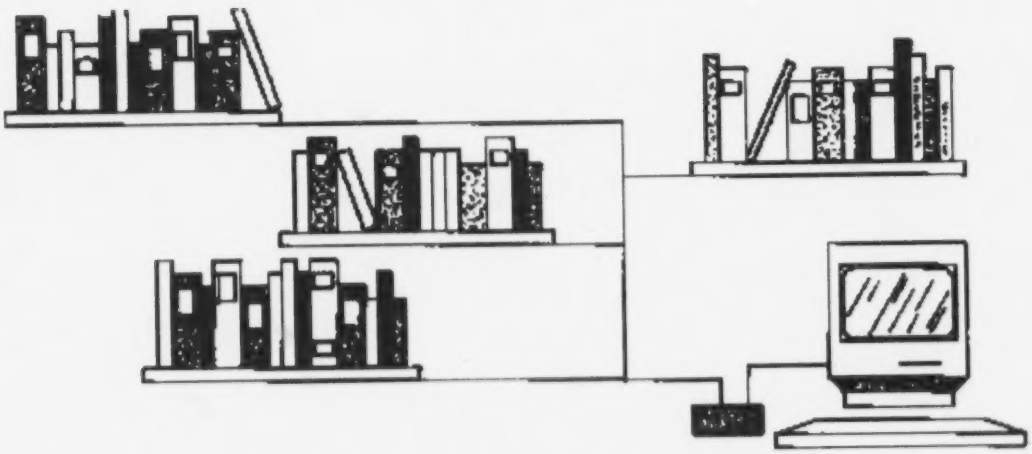

Chapter 4
File Transfers on the Internet

Think about the time you first discovered your school or neighborhood library. There were so many books inside! Perhaps you were amazed to learn that you could look at any of the books inside the library, and most could be taken home for a week or more for free. You were probably warned, though, of your responsibilities in taking good care of the books that you borrowed. No matter how much they seemed to need more pictures, you were not to draw in them. If you wanted to change the ending of the story, you couldn't write the revision on those last few blank pages. And if your name was Patty, but the story was about a fearless boy named Peter, and you thought that the book should be called *Patty Pan*, not *Peter Pan*, you weren't allowed to change the name anywhere but in your imagination.

The Internet contains many collections of electronic documents, called file archives, from which information is accessible as freely as it is from a school or public library. However, Internet archives contain primarily ASCII text, multimedia documents, and computer software, not books, journals, and tapes. The documents that you retrieve from file archives are not borrowed for a specified period of time; they are yours to keep and use in whatever ways you choose, as long as you do not violate any posted copyright regulations or attempt to sell the information. The documents can come from any of thousands of archive sites (disk storage space on large-capacity computers with Internet addresses), which are located all over the world. Unfortunately, there is no card catalog to help you find files by author or subject. (Use of Archie, a searching

tool that can assist in the location of files by title, will be discussed later in this chapter.)

Many Internet sites, or hosts, contain files that are useful for computer scientists and engineers, such as documentation for new programming languages or fixes for existing program bugs. An increasing number of archives are now including documents of use to K-12 teachers and students. One such set of Internet sites is the home of Project Gutenberg, a not-for-profit effort with a goal of 10,000 electronic books available online by the year 2001. At the present time, Project Gutenberg offers:

- children's books, such as *Peter Pan*, *Alice in Wonderland*, and *Alice Through the Looking Glass*
- books for older children and adults, such as *Moby Dick*, *Paradise Lost*, and *The Holy Quran*
- historical documents, such as the Declaration of Independence, the U.S. Constitution, and *The Federalist Papers*
- popular poetry, such as "The Hunting of the Snark" and "The Night Before Christmas"
- other reference materials, such as *The World Fact Book*

Certainly there are learning contexts in which these works should be used in their traditional paper formats. Yet in addition, consider how students could personalize an electronic version of *Peter Pan* in the workspace of their word-processing programs, or how a group of creative classmates could study and apply the unique language in "The Hunting of the Snark." Clearly, there are rich possibilities for active interaction with language when texts are freely available in a form that allows them to become dynamic learning tools.

The transfer, or downloading, of files from archives on the Internet, usually occurs in one of two ways. The first, direct transfer of a file (to your computer, if it has its own Internet address, or, more commonly, to your electronic account on a large-capacity computer) is accomplished through the use of another telecomputing option, the FTP (file transfer protocol) session. With the second method, for Internet users whose accounts do not have FTP capabilities, files can be requested from some archives by e-mail.

Transferring ASCII Text Files Using FTP

An ASCII or standard text file is one that contains characters coded in ASCII (American Standard Code for Information Interchange). Transferring ASCII text files with FTP procedures is relatively simple. Enter your electronic account but do not access the e-mail program. Instead, find the system prompt, which allows you to type commands in the host computer's operating language

(such as Unix or VMS). This is probably the same prompt that you used to **telnet** to sites on the Internet for interactive sessions (see Chapter 3). The system prompt on TENET, the statewide Texas educational network that I use for Internet access, looks like this:

```
Tenet>
```

You may need some assistance from computer services personnel in the institution that gives you Internet access to help you find your way to the system prompt, or, if you're lucky, to a special set of commands that allows easy FTP file transfer.

Connecting to the Archive

The next step is to tell the computer that houses your account to connect to a specific Internet address so that you can transfer files. The **ftp** command (or **open** command—on some systems that automatically access the FTP program when you select this option from a menu) followed by the Internet location of the file archive indicates that you intend to transfer files from the remotely located computer to your account space.

```
Tenet> ftp uiarchive.cso.uiuc.edu
```

In the preceding example, **uiarchive.cso.uiuc.edu** is one location of Project Gutenberg files. When a direct connection with the remotely located computer is established, you will see something like this:

```
Connected to uiarchive.cso.uiuc.edu.
220 uiarchive.cso.uiuc.edu FTP server (Version wu-2.1c(1) Tue Nov 9 03:44:28 CST 1993)
ready.
Name (uiarchive.cso.uiuc.edu:jbharris):
```

Because you probably do not have an active account to use on this other computer, it is necessary to tell it that you want to log in without specifying a particular username. To do this, you must type **anonymous** when prompted for a name.

```
Name (uiarchive.cso.uiuc.edu:jbharris):anonymous
```

The computer program will reply in a manner something like this:

```
331 Guest login ok, send your complete e-mail address as password.
Password:
```

Instead of typing the password to your own account (which you should never give to anyone, so that your account stays secure), you should enter your Internet address, so that the archive administrators can keep track of the distribution and frequency of remote logins. Typically, you will not see the letters that you type as you enter your Internet address at the Password: prompt. You will know when you can begin exploring the holdings of the archive when you see something like this:

```
230 Guest login ok, access restrictions apply.
```

This means that you can access any of the files in the open-access area. (Just ignore the numbers at the beginnings of some of the messages that the host computer sends you.) Notice that the prompt that you see on the screen changes, telling you that you are using the FTP facilities at this site. It may now look like this:

```
ftp>
```

or like this:

Navigating at the Archive

Your next question is probably something like, "What files are here that I can use?" You can pose that question to the **ftp** program like this:

```
ftp> dir
```

The **dir** command is an abbreviation for "directory." In response, the program will tell you that it has received your command, and that it is being carried out.

```
200 PORT command successful.
150 Opening ASCII mode data connection for /bin/ls.
```

The list of the site's public access files and subdirectories will then appear. This Project Gutenberg site showed two screens of entries in early January 1994. The

last few are listed in the following example. By the time you visit the site, the list will probably have changed.

```
drwxr-xr-x    2 zinzow    wheel      50176   Oct 24      2001    pcsig2
drwxrwxr-x    2 root      micro      1024    Dec 19      1999    pspice
drwxrwxr-t    8 root      wheel      1024    Jul 5       16:43   pub
drwxrwxr-x    2 root      micro      6144    Jun 12      2000    simtel20
drwxrwxr-x    2 root      micro      1024    Aug 12      2000    uiuc
drwxrwxr-x    2 root      staff      1024    May 21      2000    unix
drwxr-xr-x    2 jgross    micro      1024    Jul 5       09:33   usage.stats
drwxr-xr-x    3 root      micro      1024    Jun 20      2000    usr
drwxrwxr-x    2 root      micro      1024    Jul 17      14:00   video
drwxr-x---    4 root      wp         1024    Jul 31      2001    wp
drwxr-xr-x    2 hart      micro      1024    Jun 19      2001    zip93
226 Transfer complete.
```

One entry is printed on each line of the list, and the name of the entry is in the rightmost column. All of the entries in the preceding example are subdirectories, or collections of files, which cannot be directly downloaded. (Subdirectories are analogous to folders on the Macintosh.) Any entry that begins with the letter "d" in the leftmost column is a subdirectory. If the entry begins with the symbol "-", chances are it is a file of some sort. If the entry begins with the letter "l", that means that it is a subdirectory in another part of the archive, and selecting it will create an automatic link to that subdirectory.

At most public file archive sites on the Internet, there is one subdirectory listed at this level that is called *pub*, *public*, *public_access*, or something similar. These are the subdirectories that most often contain the files that you can download with an anonymous FTP file transfer.

To see the contents of a particular subdirectory (in this case, the subdirectory called *pub*) you must tell the computer program to change to that directory, which can be accomplished with the **cd** command. (To change from a subdirectory back to the directory one level above it, use the **cdup** command.)

```
ftp> cd pub
```

The computer program will respond with something like this:

```
250 CWD command successful.
```


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This implies that you have entered the subdirectory. To see what the contents of the subdirectory are, the **dir** command can be used again.

```
ftp> dir
200 PORT command successful.
150 Opening ASCII mode data connection for /bin/ls.
total 7
drwxr-xr-x     2 root      wheel    1024    Jul 27   1999    .NeXT
drwxrwxrwt    63 root      wheel    2048    Jun 3    02:29   .NextTrash
drwxr-xr-x     9 zinzow    wheel    1024    Apr 21   21:07   cache
lrwxrwxrwx     1 root      wheel    13      Jul 5    16:41   doom -> ../local/doom
drwxr-xr-x    13 hart      wheel    1024    Jul 22   08:03   etext
drwxr-x---     6 hart      wheel    1024    Jul 17   21:07   hart
lrwxrwxrwx     1 root      wheel    15      Jul 5    16:43   jgross -> ../local/jgross
lrwxrwxrwx     1 root      wheel    14      Jun 21   16:25   linux -> ../local/linux
drwxrwxr-x     8 root      wheel    1024    May 21   10:09   local
226 Transfer complete.
607 bytes received in 1.6 seconds (0.36 Kbytes/s)
```

Notice that six of the entries in this subdirectory list are additional subdirectories, and three of the entries are links to subdirectories in other locations. If you ever forget the name of the subdirectory that you are exploring, issue the **pwd** (print working directory) command.

At this particular site, the Project Gutenberg electronic texts (etexts) are stored in the *etext* subdirectory. To get there and see what is available, the change directory (**cd**) and directory (**dir**) commands can be used again. (During your next visit to this Project Gutenberg site, you may want to go to the *etext* subdirectory with one step, rather than two steps. To do so, you can tell the **ftp** program to **cd pub/etext**. Subdirectory names can be added with slashes to save time and typing.)

```
ftp> cd etext
250 CWD command successful.
ftp> dir
200 PORT command successful.
150 Opening ASCII mode data connection for /bin/ls.
total 219
-rw-r--r--     1 root       wheel         191      Mar 20   1994     .dir3_0.wmd
-rw-r--r--     1 root       wheel          11      Mar 20   1994     .hidden
-rw-r--r--     1 root       wheel         283      Sep 12   03:40    .message
-rw-r--r--     1 hart       wheel       42858      Sep 14   09:00    0INDEX.GUT
-rw-r--r--     1 hart       wheel        9351      Aug 27   17:44    INDEX100.GUT
-rw-r--r--     1 hart       wheel        7268      Aug 21   15:44    INDEX200.GUT
-rw-r--r--     1 hart       wheel        8434      Aug  1   15:44    INDEX400.GUT
-rw-r--r--     1 hart       wheel        9214      Jan 15   1990     LIST.COM
-rw-r--r--     1 hart       wheel        4420      Dec  1   1991     NEWUSER.GUT
drwxr-xr-x     3 hart       wheel        1024      Sep 13   15:26    articles
-rw-r--r--     1 hart       wheel       15156      Aug 21   15:52    biblio.gut
drwxr-xr-x     2 hart       wheel        1024      Dec 10   1993     etext90
drwxr-xr-x     2 hart       wheel        2048      Jul 18   18:26    etext91
drwxr-xr-x     2 hart       wheel        2048      Aug 27   17:46    etext92
drwxr-xr-x     2 hart       wheel        4096      Aug  8   16:34    etext93
drwxr-xr-t     3 hart       wheel        4096      Aug 21   15:39    etext94
drwxr-xr-x     2 hart       wheel        6144      Sep 13   18:23    etext95
drwxr-xr-x     2 hart       wheel        1024      Aug  4   1993     freenet
drwxr-x---     3 hart       wheel        1024      Feb 25   1995     hart
drwxr-xr-x     8 ippe       wheel        1024      Jun 30   22:46    ippe
drwxr-xr-x     2 root       wheel        8192      Mar  1   1994     lost+found
-rw-r--r--     1 hart       wheel        1220      Apr 26   15:35    mrcdir
-rw-r--r--     1 hart       wheel       51276      Sep 21   1994     o640.gif
drwx-wx---     5 hart       outgoing    27648      Sep 14   16:12    outgoing
-rw-r--r--     1 hart       wheel        6396      Aug  6   17:53    standard.new
226 Transfer complete.
ftp>
```

Notice that 13 of the entries listed are files, rather than subdirectories; the first character in the leftmost column is a "-". The six files that end in *.GUT* or *.gut* are text files that give information about Project Gutenberg and the texts that it offers for file transfer. The subdirectories *etext90*, *etext91*, *etext92*, *etext93*, *etext94*, and *etext95* contain the majority of the actual Project Gutenberg documents. If, for example, we wanted to see what documents are available inside the *etext92* subdirectory, we could use a **cd etext92** command, followed by a **dir** command.

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The contents of the *etext92* subdirectory are too long to list here, but the following example shows some of the entries.

```
-rw-r--r--  1  hart  wheel  21926    Jun 17  2001  magil10.txt
-rw-r--r--  1  hart  wheel  1365180  Apr 4   2001  nusirg10.ps
-rw-r--r--  1  hart  wheel  235567   Oct 22  2000  oedip10.txt
-rw-r--r--  1  hart  wheel  103284   Oct 22  2000  oedip10.zip
-rw-r--r--  1  hart  wheel  315859   Oct 16  2000  opion10.txt
-rw-r--r--  1  hart  wheel  138296   Oct 16  2000  opion10.zip
-rw-r--r--  1  hart  wheel  328820   Dec 3   2000  opion11.txt
-rw-r--r--  1  hart  wheel  137181   Dec 3   2000  opion11.zip
-rw-r--r--  1  hart  wheel  481030   Oct 16  2000  plrabn10.txt
-rw-r--r--  1  hart  wheel  221387   Oct 16  2000  plrabn10.zip
-rw-r--r--  1  hart  wheel  482823   Dec 8   2000  plrabn11.txt
-rw-r--r--  1  hart  wheel  214541   Dec 8   2000  plrabn11.zip
-rw-r--r--  1  hart  wheel  493522   Feb 21  2001  plrabn12.txt
-rw-r--r--  1  hart  wheel  215975   Feb 21  2001  plrabn12.zip
```

These sample entries in the *etext92* subdirectory are files, and many have the characters *.txt* appended to their names in the rightmost column. This indicates that the format of these files is ASCII. When files of this type are downloaded, they can be fed directly into the working space of most word processors, then read, amended, and/or appended. They can also be read online. Other file types must be decoded with additional software. (See Chapter 5 for an introduction to the most common of these alternate file types, such as *.gif*, *.Z*, and *.zip* files, along with suggestions on how to decode them.)

The file lists in many FTP archive subdirectories are very long, and will scroll by on your screen very quickly once you type and send the **dir** command. One way to make it easier to read the lists of files is to hold down the <Control> key with one finger and press the **s** key once with another finger to temporarily stop the scrolling. Holding down the <Control> key and pressing the letter **q** will cause the scrolling to resume. Another way to make a long list of files more readable is to use your telecommunication software's capture file option to capture the file names as they quickly scroll across the screen, then save them to disk as an ASCII text file that can be read using your word processor. The manual for your telecommunications software package will provide specific instructions on how to capture information that flows across your screen.

A final option that allows you to see long file directories at a slower pace solves the problem in a different way. Once you have entered a subdirectory at a Unix-based anonymous FTP archive, you can save a copy of that subdirectory's file directory by typing the **dir .** *filename* command in Unix. This causes a text file to be created in your Unix-based account space that includes the complete directory listing from the subdirectory that you are anonymously visiting. This file is automatically stored in your own Internet account. For example, the sequence of commands that allows me to create a text file containing the very long list of files in the *etext95* Project Gutenberg subdirectory looks like this:

```
ftp> cd etext95
250 CWD command successful.
ftp> dir . etext-95-directory.txt
output to local-file: etext-95-directory.txt? y
200 PORT command successful.
150 Opening ASCII mode data connection for /bin/ls.
226 Transfer complete.
ftp>
```

It is important to note the size of the files offered to you. O'Henry's "The Gift of the Magi," for example, is in the file named *magi10.txt*, and contains approximately 22,000 characters. Considering that a typical double-spaced page of text is composed of approximately 1,000–2,000 characters, file sizes, which appear in the middle of archive subdirectory lists, can help you determine whether you have sufficient disk and/or account space to receive the file.

Obtaining the File

To receive a copy of a file that you have chosen, use the **get** command.

```
ftp> get magi10.txt
```

The **ftp** program will then show you notes on the file transfer process as it occurs.

```
200 PORT command successful.
150 Opening ASCII mode data connection for magi10.txt (21926 bytes).
226 Transfer complete.
local: magi10.txt remote: magi10.txt
22432 bytes received in 0.47 seconds (47 Kbytes/s)
```

File transfer between the site of the archive and your electronic account is exceptionally fast. The file that you have just downloaded will now wait in your account space until you transfer it to your personal computer. This second file transfer procedure is a bit different for each combination of personal computer, telecommunications package, and type of Internet account. The appropriate sequence of steps for these different file transfer methods, or protocols, can be learned from the telecommunications software manual and the Internet account documentation, or (even better) a helpful colleague. The speed of file transfer to your personal computer will probably be much slower than the speed with which the file was transferred from the FTP archive to your electronic account. This is because file transfers between different locations or nodes on the Internet are often made possible by connections that are much faster than the typical modem and telephone line connection.

Previewing File Contents

Perhaps you are now wondering how it is possible to know what is contained in each of the files that are listed in a subdirectory. The best way to find out is to download the *INDEX* or *README* file when you first visit an archive. *INDEX* or *README* files usually give helpful information about the site itself and also about its contents.

If your electronic account is housed on a computer that runs an operating system called Unix, you can use the **|more** (pipe more) command to preview the contents of text files online. (The character before the **more** command is a pipe, not a lowercase letter "L.") This is a very helpful option because it can help you to decide whether you want to **get** the file or not. Let's say that you want to find out what the actual documents are that are listed in the different *etext* subdirectories. The *INDEX100.GUT* file in the *etext* subdirectory contains that information. Because you are now in the *etext92* subdirectory, you will have to type the **cdup** command (change directory up one level) to retrace your path to the *etext* subdirectory.

```
ftp> cdup
250 CWD command successful.
```

Then, on a Unix-based machine, if you type:

```
ftp> get INDEX100.GUT |more
```

you will see something like this:

```
ftp> get INDEX100.GUT |more
200 PORT command successful.
150 Opening ASCII mode data connection for INDEX100.GUT (9189 bytes).

This is an Index of the first 100 Project Gutenberg Etexts (gutindex.100) mh

(Pre-1991 etexts are now in> cd /etext/etext90,
(These 199x etexts are now in> cd /etext/etext9x)
(Do a dir *.zip or dir *.txt to see exact names.)

(Short index is updated every day…get 0INDEX.GUT from /etext/articles)

Mon   Year    Title/Author                                    (filename.ext)   ##

Jan   1994    The Complete Works of William Shakespeare (LOF)  (shaks10x.xxx)  100C
Jan   1994    Ludwig van Beethoven, 5th Symphony in c-minor #67 (lvb5s10x.xxx)  99
Jan   1994    A Tale of Two Cities, by Charles Dickens (CD#1)  (2city10x.xxx)  98
Jan   1994    Flatland, by Edwin A. Abbott (Math in Fiction)   (flat10xx.xxx)  97
Jan   1994    The Monster Men, by Edgar Rice Burroughs         (monst10x.xxx)  96

--More--
```

77

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Once a screenful of information is displayed, you can press the <Space Bar> to advance to the next screen. If you wish to stop the display, you can interrupt the process by pressing the letter **q**. The **|more** command can only be used with Unix-based electronic accounts. If you are connecting to a site with a different operating system, you will have to depend on the *README* or *INDEX* file (and your intuitive title translation skills) to help you choose files for transport.

Exiting the Archive

When you are finished exploring a particular archive, exiting is as easy as saying good-bye.

```
ftp> bye
```

The **ftp** program will probably respond:

```
221 Goodbye.
```

and then automatically return you to the system prompt in your electronic account.

Suggested File Archives for Educational Use

Project Gutenberg is an especially good example of an FTP archive that is useful to teachers and students. It is not the only such collection of text documents, however. Project Hermes (address: **ftp.cwru.edu**, subdirectory path: *hermes/ascii*) is an archive that provides recent Supreme Court opinions; the Lyric and Discography FTP archive (address: **cs.uwp.edu**, subdirectory path: *pub/music*) contains lyrics for more than 1,000 songs, classified by artist; and the History archive (address: **ra.msstate.edu**, subdirectory path: *pub/docs/history*) contains documents that pertain to the study of history. These are a few of the many file sources that are just an **ftp** command away. Additional file archives recommended for use by educators are listed in Appendix 4 of this book.

Finding the sites can be time-consuming, unless you have well-organized, helpful information prepared by people who have spent considerable time exploring the Internet. Several groups of such people from eastern Nebraska, western Iowa, and Texas have created a four-part *Internet Resource Directory for Educators* (IRD) to help you locate useful Internet resources for education. One of the four sections of the IRD contains information about FTP sites written in a friendly style. To obtain this section of the IRD, **ftp** to: **tapr.org** and change (**cd**) to the subdirectory: *pub/ed-telecomputing/IRD*.

The file that contains **ftp** information is named *IRD-ftp-archives.txt*. The other three files in the subdirectory are the other three sections of the IRD, and contain information about Telnet sites (see Chapter 3 for more information about **telnet**ting), mailing lists (see Chapter 7 for an introduction to discussion groups), and ideas for integrating telecommunications use into existing school curricula. This is not a comprehensive listing of all sites and application ideas of use to teachers and precollege students with Internet access; rather, it is the beginning of what we hope will be an ongoing, collaborative effort to share information among telecomputing teachers and learners.

I have the good fortune to work with the dedicated groups of graduate students that write, field-test, and revise this directory once or twice each year while enrolled in an "Internet-Based Telecomputing" class, now taught at the University of Texas at Austin. The IRD is our gift to the Internet community.

Finding It With Archie

With literally millions of files sitting on the Internet in thousands of archives, locating the text, graphics, or software that you need for tomorrow's class could be a daunting task. Fortunately, folks at McGill University invented a useful file searching service called Archie to do the locating for you. Archie is a tool that can be used interactively with a Telnet connection or client-server software, or noninteractively via e-mail.

Approximately once each month, the Archie tool at McGill University contacts each of the approximately 1,200 FTP archive sites that it recognizes, and gathers a listing of all of the subdirectory titles and file names from each. It then sends that information electronically to all of the Archie servers located on the Internet. In September 1993, those servers included machines in the following locations.

Archie Server Sites

	Internet Address	IP Address
Maryland, U.S.A.:	archie.sura.net	128.167.254.179
Nebraska, U.S.A.:	archie.unl.edu	29.93.1.14
New York, U.S.A.:	archie.ans.net	147.225.1.2
New Jersey, U.S.A.:	archie.rutgers.edu	128.6.18.15
Washington, D.C., U.S.A.:	ds.internic.net	198.49.45.10
Australia:	archie.au	139.130.4.6
Austria:	archie.univie.ac.at	131.130.1.23
Canada:	archie.mcgill.ca	132.206.2.3
Finland:	archie.funet.fi	128.214.6.100
Germany:	archie.th-darmstadt.de	130.83.128.111
Israel:	cs.huji.ac.il	132.65.6.5
Japan:	archie.kuis.kyoto-u.ac.jp	130.54.20.1
Korea:	archie.sogang.ac.kr	163.239.1.11
Sweden:	archie.luth.se	130.240.18.4
United Kingdom:	archie.doc.ic.ac.uk	146.169.11.3

Because Archie is a popular, memory-intensive service, users are requested to connect to the server nearest their log-in location to distribute the Internet traffic as evenly as possible. The simplest way to access Archie is to **telnet** to the closest server. Once connected, Archie can help you to locate files for FTP transfer, as long as you know or can deduce part of the desired file name.

A Sample Search

Let's assume that you've heard of a file available on the Internet that contains electronic symbols used in telecomputing that convey emotion in text-character pictures. These are usually called "emoticons" or "smileys." This is a smiley: **:-)**. If you look at the page while tilting your head to the left, soon you will see a pair of eyes ":"; a nose "-"; and a smiling mouth ")". With just one command, Archie can help you find any file name in its bank of 1,200 FTP sites that contains the word "smileys."

First, we must connect to an Archie server. Because I live in Texas, I should choose the server in Nebraska (**archie.unl.edu**). At the system prompt in my Internet-accessible account, I use the **telnet** command to establish an interactive connection to Archie.

```
System> telnet archie.unl.edu
```

When the connection is established, a login: prompt is displayed from the server. To use the Archie service, I log in with **archie**. If a Password: prompt is displayed, I use **archie** for the password, also.

```
login: archie
```

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Once the Archie program begins interactive execution, I see a banner announcing its availability:

```
################################################################################
        #     # ####### ######  ######     #     #####  #    #     #
        ##    # #       #     # #     #   # #      #    #    #     # #
        # #   # #       #     # #     #  #   #     #    #  #       #   #
        #  #  # #####   ######  ######  #     #    #    ###     #     #
        #   # # #       #     # #   #   #######    #    #  #    #######
        #    ## #       #     # #    #  #     #    #    #   #   #     #
        #     # ####### ######  #     # #     #    #    #    #  #     #

Welcome to the ARCHIE server at the University of Nebraska - Lincoln

Please report problems to archie-admin@unl.edu. We encourage people to use client software
to connect rather than actually logging in. Client software is available on ftp.unl.edu in
the /pub/archie/clients directory.

If you need further instructions, type help at the unl-archie> prompt.

############################################################ ##################

unl-archie>
```

The unl-archie> prompt tells me that Archie is ready to receive my commands for file searches. To locate files on the Internet that contain the word "smileys" in the file name, I type:

```
unl-archie> prog smileys
```

As the Archie program is searching through its lists of file names, I can watch its progress by observing the changing numbers at the following prompt. (Note that sometimes these numbers are inaccurate.)

```
unl-archie> prog smileys
# Search type: sub.
# Your queue position: 3
# Estimated time for completion: 00:36
working... \
```

When the search is complete, the file names and locations (including subdirectory paths) for all "hits" are automatically displayed. In this example, three files were located at two different sites.

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```
Host umaxc.weeg.uiowa.edu       (128.255.56.80)
Last updated 17:52  5 Aug 1994

    Location: /pub/class
      FILE      -rw-r--r--       481 bytes    00:00 11 Sep 1993    smileys.txt


Host ftp.u.washington.edu       (140.142.56.2)
Last updated 08:52 29 Jul 1994

    Location: /pub/user-supported/irc/help/LOAD
      FILE      -rw-r--r--       199 bytes    08:09 22 Apr 1994    SMILEYS

    Location: /pub/user-supported/irc/script
      FILE      -rw-r--r--       263 bytes    00:00 18 Aug 1993    smileys
```

The file *smileys.txt* was located in the */class* subdirectory, which exists inside the */pub* subdirectory at the **umaxc.weeg.uiowa.edu** or **128.255.56.80** site in Iowa City, Iowa. The file *SMILEYS* sits in the */pub/user-supported/irc/help/LOAD* subdirectory path at **ftp.u.washington.edu**, which is in the state of Washington. (Notice that an older *smileys* file exists in a different subdirectory path at the same site.) This information can be captured for later use by printing the screen image on a printer, putting it into a session log or capture file with the telecommunications package in use, or asking Archie to mail the results of the search electronically to the user's Internet address using the following command. (Use your own e-mail address when you experiment with this command, of course.)

```
unl-archie> mail jbharris@tenet.edu
```

To exit Archie type **exit**, **quit**, or **bye** at the prompt.

With all of this "out there" to explore, why are you still reading this chapter? Do some electronic ferreting, unless your Internet account does not allow you to use FTP commands. In that case, please see Chapter 6, which describes ways of retrieving files from FTP archives via electronic mail.

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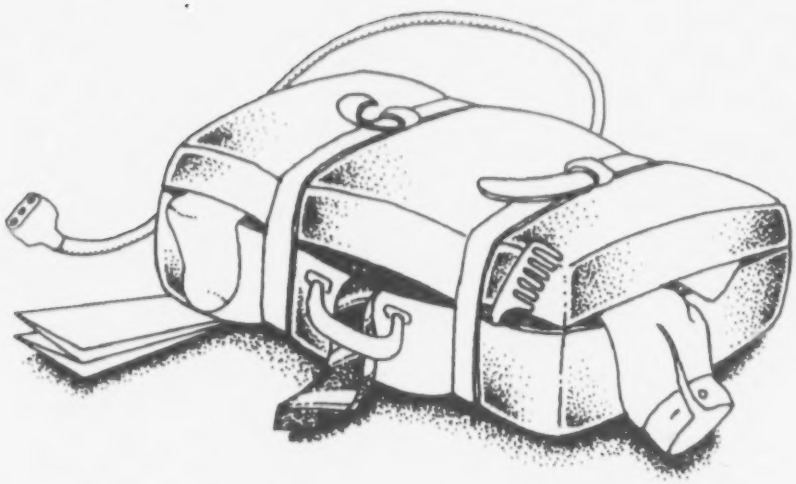

Chapter 5
Receiving and Uncompressing Files

Many different types of packages are delivered by surface (nonelectronic) mail. To name just a few, there are postcards, letters in small envelopes, longer documents in larger envelopes, small objects in padded mailers, larger objects in boxes stuffed with newspaper, and even larger objects in larger boxes cushioned with Styrofoam.

Packages of electronic information (text, graphics, sound, and computer code) are similarly carried in different types of containers on the Internet. These electronic packages can travel attached to e-mail messages, in response to a request for information from a Gopher, or as a result of an FTP file transfer command issued while visiting a public file archive. To use the information included in these files, one must be able to recognize the type of container in which it arrived, and then know how to open the container without damaging its contents.

Think of an e-mail message as a postcard. When you receive a postcard in your mailbox, all you need to do to access its textual information is to read the writing. Although the process by which you access your e-mail may not be as uncomplicated as picking up a postcard and reading it, remember that once you have launched your e-mail program, the information contained in the received messages is directly accessible and (hopefully) comprehensible. The same is

true with publicly posted newsgroup articles, electronic bulletin board messages, and computer conference items and responses. (See Chapter 7 for more information on discussion groups.)

ASCII (Standard) Text Files

Many publicly accessible files of information available on the Internet are packaged like postcards in the surface mail. The information they contain is in a standard or ASCII text format that is readable on any computer platform. Most of the files accessible via Gopher tools and many files available for anonymous FTP transfer from archives exist in standard text format. Files saved in this standard format require no special procedures to open and view. They can be viewed online or as a document displayed with a word-processing program. Usually, files that exist in text format in archives on the Internet have file names that end in one of the following extensions: *.txt* (example: *alice27a.txt*), *.text*, *.doc*, *.ascii*, or *.vox*.

Binary Files

Now think about a letter that is delivered in an envelope. To access the information contained in the text of the letter, you must first open the envelope. If the envelope is made out of lightweight paper, you can use your fingers to extract the information from the package. If the container is made of a thicker material, a cutting tool is probably needed to assist in opening the parcel. If there is packaging material that surrounds the object (the file of information) in the parcel, that, too, must be removed before the information can be viewed in a way that is understandable to you.

The files available in Internet archives that are not ASCII text files are called binary files. Binary files can be specially formatted text files, such as those that contain PostScript printing commands (with file names often ending in *.ps*), graphics files, sound files, video files, or software files. Some binary file names end in *.bin*. These are typically relatively small files that contain computer programs specific to a particular microcomputer type, such as the Macintosh. Smaller software programs that run on IBM and IBM-compatible microcomputers are often stored in files whose names end in *.exe*.

Graphic images that are contained in binary files have names that end with many different extensions, each indicating the format of the image. Some of the more common graphics files include those whose names end with: *.gif*, *.tiff*, *.jpeg*, or *.pict*.

Sound bites that are contained in binary files have names that can end with *.au* (Unix-created audio files), *.wav* (*.wave* files), or *.voc* (*Soundblaster* files). Compressed video sequences, such as those created with Macintosh *QuickTime*

84

software, also have special file name extensions, such as *.qt* (although many have been encrypted as *.hqx* files, as discussed in the next section). Sound, video, and graphic image files are usually quite large.

Binary files transferred to your personal computer via the Internet require various procedures to "unpack" the information they contain, making it available for your use. The contents of binary files usually cannot be viewed online or seen in their entirety with a word processor. Instead, they must first be unpacked with a special file transfer process or another piece of software. This can be as simple as printing a *.ps* file from a word-processing program that has printer drivers for PostScript printers. This also can be as complex as downloading and uncompressing the software that is used to view *.gif* images, in addition to downloading the images themselves.

Binary File Transfers

The process used in transferring binary files from public archives to your personal computer depends on the type of connection that you are using to access your Internet-based account. For those of you lucky enough to have a direct connection (usually involving a unique Internet address) from your personal computer to the Internet (usually via an Ethernet connection or other type of high-speed local area network), file transfer can occur in just one step, from the Internet source directly to your personal computer.

Because most of you use modems connected to regular voice telephone lines, you can envision file transfer as a two-step process.

1. First, the file that you want to have must be transferred from the FTP archive, Gopher site, or e-mail message attachment to your file space in your Internet account.

2. Then it must be downloaded from your account space to your personal computer's hard drive or a floppy disk.

The default file transfer method enabled at most Internet-accessible sites is a method used for text files. Therefore, if you want to transfer any type of binary file from an Internet site, you must issue a command *before* the file transfer begins that will allow the file to be transferred as it exists at the site, rather than as a text file. (If a binary file is transferred as a text file, it will be unusable.)

Once a noninteractive connection to an FTP archive has been established and a binary file that you would like to transfer has been located in a specific subdirectory path, send a **binary** or **i** command to switch the file transfer mode to binary *before* issuing the **get** command to obtain a copy of the file. The remote site will respond when the command is sent to confirm the mode switch.

```
ftp> binary
200 Type set to I.
```

The mode will remain as binary for the rest of that session unless it is switched back to text mode with the **ascii** command.

Now that the file is stored in the proper format in your account space, it must be downloaded to your personal computer's hard drive or a floppy disk. How this downloading process is accomplished depends on the type of telecommunications software that you are using and the provisions for file transfer that your Internet account managers have made. You may have to consult the software manual for your telecommunications package and perhaps the documentation supplied by the computer center for specific downloading procedures. However, this second-step file transfer also *must be completed in binary mode* for the information in the retrieved file to be viewable.

BinHex (.hqx) Files

As microcomputer software functions continue to evolve, an increasing number of packages support the creation of documents that combine text and graphics, or include specially formatted text (such as text written with different fonts, boldfacing, underlining, italics, or different colors, and text formatted like the text that you see on this page). These documents, though they appear to be primarily textual, must be transferred as binary files if the special formatting is to be conserved and if the graphic images are to be included.

As you saw in Chapter 4, this is not a problem if an FTP file transfer can be completed. But what if one person with an e-mail account wants to send a binary file to another person with an e-mail account? On some e-mail systems, files can be attached in their original forms to e-mail messages, then sent intact to addressees. But if this feature is not available to either of the correspondents, how might the direct exchange of a binary file take place?

The answer lies in a powerful piece of freeware (freely copyable and distributable software) developed by Yves Lempereur for the Macintosh called *BinHex*. This program takes Macintosh files created with word processors, desktop publishing programs, graphic generators, sound generators, and so forth, and encrypts them into files of text characters. The files can then be sent via text-based services, such as e-mail, or transferred to and from FTP archives in text mode. These text characters mean nothing to the human eye, as the following sample from a *BinHex*ed file illustrates.

```
:&P0KEA'XC5'8CAKd)#BJ4h*KF'KTBh!9d4#6Ne69d3!N!3N!*!&YNlq0'!M!*!'$!!!'3#3#!percent!N!'p'!!)
id!N!Ih!*!D)J!!*!!!)J!!*!!!)L3!N!3L*!#3"#)N!!!!!#)b!")!!#*percent!*!percent)N3!N!3L4!#3"#*
percent!!S!!#*!!!S!!#*B!*!percent)PJ!&J!!)Qi!H!!!)N3!N!3LjJ!J!!!M"J!@!!!M,!!U!!!M9J#3"#!N!
*!$!3!'!!!M,!#3"#F!'!!!#X!*!percent)b'!N!3M9J!h!!!M,!#3"#X!*!percent)b'!N!3M,!#3"#X!*!perc
ent)b'!N!305'9bC5Gc)'&Z)'9iB@e'E'8JEfBJB5'hEh*N)("bEf0PFh0PC#'NEf0TBf80$5k3!h4SBA3JB@aX)'C
[FQeKG(4TEQFX)'C[ER3JFh4)E'9c,#'PG'Z)'&XC@3L)(4[)(P[GA)JC@aPBh4bEfjTBb'YB@FXBQpl)(CTB5'K)(
4PH(3YEfjXH5'cHA0dC@dZ$C!$!3d#G3#3"34*!3#3"P)!8'!!'$X)!!!'!*!&8J'6'#X!dJ''!53"e'percent'!3
!+!*!percent!9B#!*J!$!$5!B!'*!(B!0)'J3percentN!G3!dJ''!53'e!!!![8!%[8!"J!2q2rr!!B!$rMrr'!)
!!cj!!!$r'!)!!cj!!!$r'!)!!cjr'$cr'!*!3b!qJ!!percentrm!#3percentJ2S!!'2r!!N'$,rkr'$6r'!0#3b
r[(J+[ir#L*2r!!d*$+percent4Jd!Hm$)Nrm!$3NU5Bid1Mmb@L6r'!0#3bjIiririm2j2r!!d*$,'Rrmpercent2
rj'NNrm!$3NXCrrrRrra#66r'!0#3bbFrrahrrbIP2r!!d*$+6*rmH(rrQa8rm!$3NUpcr(lRrr(6r'!0#3bhXaMrT
RrrB02r!!d*$,FK'cqK2rqKdrm!$3NX2c1[k#2rja6r'!0#3bR'MkrZqIrcP2r!!d*$,airVqlmrrN8rm!$3NZF2q[
lJ0rr66r'!0#3bhMrkrNp,rmp2r!!d*$,EcrVqf5hr1drm!$3NV'Rq[k'T2rh6r'!0#3bSK2krVQIrG2r!!d*$+[Nr
Vqb'Frmdrm!$3NSMEq[l2dar16r'!0#3bQ9[krZH6ArY2r!!d*$+EQrVq'"'[qdrm!$3NU!Eq[k$6Z116r'!0#3bN4
[krZC(crY2r!!d*$,I1rVqI8percentcqdrm!$3NYJVq[jM6Q216r'!0#3b5@[krN!$6*[16r'!0#3bD@[krN91)IY
2r!!d*$*QbrVq4'E*qdrm!$3NR+,q[j3bC216r'!0#3b5f[krQ1bEI02r!!d*$*0#rVq6QcCpdrm!$3NNc1q[jf5Ah
6r'!0#3bIhZkrNNL6HG2r!!d*$*a1rVqGNfeldrm!$3NNFEq[j0NRh16r'!0#3bAj[kpM)XLC02r!!d*$,35rVqC0Z
,S8rm!$3NTCVq[1C0T0j6r'!0#3beZ[krb*!!1Ej6r'!0#3bhT[krNcm$I02r!!d*$*!!$[kra2rqm&2r!!d*$*1'r
VrCrrd!8rm!$3NZ!Eq[p2rmKr6r'!0#3bYI{krMrrQH92r!!d*$+5'rVqIric18rm!$3NYJ,q[rIr2XI6r'!0#3bA3
[kr'!aQ502r!!d*$*'1rVrF!Bpercentrdrm!$3NNEq[pII()06r'!0#3b58[kreRfrG2r!!d*$*EDrVrBpercent
L+!8rm!$3NN!'QrVrEfM*!8rm!$3NNb,q!p,H2NI6r'!0#3b0B[krdK'b502r!!d*$,CLr1r626)8rm!$3NFN1q[KR
a25a6r'!0#3b6M[#iq#(**02r!!d*$*!!$XHL(#1Bp&2r!!d&$*aHKBrIr[m!8rm!$!RrprrIm'Bp2r!!N'$)$k!!!
6r'!*!3b!qJ!!percentrm!#!!qIm!mrm!#!!q3!!!rm!#!!q3!!!rm!'J!2q2rr!!B!$rMrr'!#p3!#p3!#p3$r!)
S!N!percent5'percent!N!C4!&)!!!3p#!!
```


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Once the full document is received and downloaded, it can then be decrypted with the *BinHex* program to reveal its true nature. The *BinHex*ed code that you saw previously is part of what was decrypted to form the following document.

Here's an example of a word-processed document that incorporates graphics.

lease

otice

...that all formatting, font styles, etc. are preserved, even though this file just "traveled" to your electronic mailbox via a text-only system.

Given its powerful functions, *BinHex* is a remarkably small program, available at many Internet sites as an uncompressed, plain binary file. I have included several of these archive addresses and their subdirectory paths that will lead you to copies of the *BinHex* software for the Macintosh. These sites also include subdirectories for DOS and *Windows* software that you can access if you are using an MS-DOS machine.

BinHex Software Sites

FTP Address	Subdirectory Path
ftp.ncsa.uiuc.edu	*Mac/Utilities*
tamu.edu	*pub/archivers/mac*
wuarchive.wustl.edu	*packages/compression*

Please note that when transferring binary software files to a Macintosh personal computer, the MacBinary option in the telecommunications software must be selected. No analogous action for MS-DOS machines is necessary.

Many of the *BinHex*ed files that are publicly available on the Internet were encrypted with version 4.0 of the software, rather than version 5.0, so the older version should be used to decrypt first. Also, some *BinHex*ed files have additional readable text inserted at the beginnings of the documents that can cause error messages to be generated by *BinHex* when it is asked to decrypt them. If that happens to you, load the *BinHex*ed file that you are attempting to decrypt into a word processor, delete the readable text at the beginning of the file, leaving the rest of the file intact, and save the document with the same file name (ending in *.hqx*) in a text-only file before attempting again to decrypt it with the *BinHex* program.

Compressed Files

The *BinHex*ed files discussed so far in this chapter have been encrypted so that they can be transferred via Internet links. As you have seen, it is necessary to know how these files have been packed to deduce how to unwrap them.

Many files that are publicly available on the Internet are too large to merely be encrypted before storing them at FTP archives or Gopher sites. Files that are this large would take up too much disk space at the archive site and would take much too long to download with most modems and telephone line connections.

This is why these larger files (which are often software files) are first compressed so that they become smaller in size before they are stored in Internet archives. These smaller but "heavier" electronic packages can then be transferred to your personal computer's hard drive or floppy disk. The compressed file must then be *un*compressed before the information in the file can be used.

Some compressed files can be downloaded (in binary format, of course) with built-in software that can be used to uncompress the file once it is on your personal computer's hard drive or floppy disk. The most common of these files ends in *.sea* (self-extracting archive). Once downloaded, launching the program (either double-clicking on the program icon or typing the name of the file without the extension) will produce either step-by-step interactive instructions

that will lead you through a simple uncompression sequence, or will launch the program itself, if it is now ready to run.

To uncompress most files retrieved from Internet archives, though, special *additional* software, also available via the Internet, must be used. The file name extensions (such as *.zip*, *.tar*, *.sit*, and *.cpt*) for these compressed files give clues as to which piece of software (usually also compressed) must be used to uncompress the file.

To understand file compression, an analogy to packing your luggage for a trip might be useful. If you plan to be gone overnight, you will probably need to bring a change of clothes, sleepwear, and toiletries. You may need to transport more than 20 different items. Although they could be carried separately, to make them easier to bring along, you probably will choose to pack them into a suitcase. Then, instead of carrying 20+ items separately, you can carry just one.

Much like packing a suitcase, the code and supporting materials for one piece of microcomputer software, often many separate subprograms and documents, can be electronically packed for transport via the Internet. Binary files that are actually packages of multiple, smaller files are usually stored in FTP archives with the following file name extensions.

.zip zipped files

.tar tarred files

It is obviously much more convenient to transfer one zipped or tarred file than it is to download 10 to 30 separate files that cooperate to create a particular software application.

Now consider how to pack the individual items. You could just throw the articles into your luggage without preparation and without plan. That probably wouldn't make the best use of the available space in your suitcase. You might end up carrying more than one piece of luggage. The more pieces you carry, the more time and effort required. To make most effective use of the available space, you will probably fold things carefully, take only as much as you need, and place adjacent items in the bag with as little space around each as possible. In that way, the volume of your luggage will be minimized, even though the weight may be considerable. You will be compressing the items as much as possible before traveling with them.

Similarly, binary files (especially software programs) available at FTP archives and via Gopher servers are often compressed into smaller packages before they are stored at publicly accessible Internet sites. Compressing a binary file can reduce its size by 40% to 70%. This saves disk space at the archive, and makes transfer of the files to archive visitors more expedient and efficient.

When special software is used to compress files, the same or similar software must be used to uncompress the file. Compression/uncompression software is specific to particular computer types (i.e., Macintosh, IBM-compatible, Unix, etc.). Many of the same compressed files can be downloaded and uncompressed on multiple microcomputer platforms using different software packages. All of the software needed to uncompress any of the files found in FTP archives on the Internet also can be found on the Internet. Ironically, most of the software packages that are used to uncompress files are themselves stored in file archives in compressed forms. This makes early attempts at software retrieval on the Internet into a recursive treasure hunt.

Compressed files are identified by the extensions on their file names. Some of the more common compressed files include the following.

Compressed File Types

.arc	ARChived files
.cpt	files compressed with *Compact Pro*
.sit	files compressed with *StuffIt*
.Z	files compressed with *Compress* (Unix)
.zoo	ZOOsd files (VMS)

A very helpful chart of file compression types, and the accompanying uncompression freeware or shareware program names and locations for each for most computer platforms is maintained, updated, and offered to the Internet community by David Lemson (lemson@uiuc.edu). His file named *compression* is posted for anonymous FTP access at: **ftp.cso.uiuc.edu** in the subdirectory path: *doc/pcnet*.

A Sample File Uncompression Sequence

Assume that you want to obtain a piece of software that would allow you to view *.gif* pictures collected from FTP archives, using a Macintosh. An online friend has recommended the program called *GIF Converter*. If the friend did not also give you the address and subdirectory path of a location for the file, you could use Archie to find the file on the Internet (see Chapter 4).

The *GIF Converter* program can be found in the University of Michigan Software Archives, which can be accessed noninteractively (that is, with an **ftp** command) at:

mac.archive.umich.edu
subdirectory path: *mac/graphics/graphicsutil*

or at: **grind.isca.uiowa.edu**
subdirectory path: *mac/umich/graphics/graphicsutil*

To obtain a copy of the program, first **ftp** to one of these addresses, or use the Archie service described in Chapter 4 to locate it at another FTP archive. (Please type the commands printed in boldface in each of the following 10 boxes. The screens that you see online might not match exactly what you see here.)

```
Tenet> ftp mac.archive.umich.edu
Connected to mac.archive.umich.edu.
220-
220- Welcome to wuftpd 2.0 installed
220- the U of M Software Archives - Robert C.
220-
220- Local Time: Sun Aug 8 17:15:51 1993
220-
220 carpediem.cca.itd.umich.edu FTP server
(Version 2.0WU(11) Tue Apr 20 19:44:35 EDT 1993) ready.
```

Login as **anonymous**, with your full Internet address supplied when the Password: prompt is displayed.

```
Name (mac.archive.umich.edu:teatrn20): anonymous
331 Guest login ok,
Send your complete e-mail address as password.
Password:
230 Guest login ok, access restrictions apply.
```

Change directories according to the subdirectory path previously provided.

```
ftp> cd mac/graphics/graphicsutil
250 CWD command successful.
```

set the file transfer type to binary.

```
ftp> binary
200 Type set to I.
```

then **get** a copy of the file.

```
ftp> get gifconverter2.37.cpt.hqx
200 PORT command successful.
150 Opening BINARY mode data connection for gifconverter2.37.cpt.hqx (468615 bytes).
226 Transfer complete.
468615 bytes received in 11 seconds (42 Kbytes/s)
```

92

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The *GIF Converter* software file has been encrypted as well as compressed, as is indicated by the two extensions at the end of the file name: *gifconverter2.37.cpt.hqx*.

The last file name extension (*.hqx*) indicates that the file, once downloaded to your personal computer, must *first* be decrypted using a copy of the *BinHex* program. The second-to-last file name extension (*.cpt*) indicates that the file, once un-*BinHex*ed, must be uncompressed with *Compact Pro*. Therefore, to use the *GIF Converter* program, you must first **ftp** copies of *BinHex* and *Compact Pro*.

Transferring the Uncompression Software

Because the University of Michigan Software Archives contain many useful programs available for public access, you need only to change to a different subdirectory path to access copies of *BinHex* and *Compact Pro*. By retracing two subdirectory changes just made,

```
ftp> cdup
250 CWD command successful.
ftp> cdup
250 CWD command successful.
```

a new subdirectory path can be accessed.

```
ftp> cd util/compression
250 CWD command successful.
```

Both the *BinHex* (version 4.0) and *Compact Pro* (version 1.51) files are included in this subdirectory. (You may find newer versions when you access this site.) To transfer copies of them to the file space in your Internet account, first change the file transfer mode to binary.

```
ftp> binary
200 Type set to I.
```

then **get** copies of the two pieces of software that you intend to use to decrypt and uncompress the *GIF Converter* file.

```
ftp> get compactpro1.51.sea.hqx
200 PORT command successful.
150 Opening BINARY mode data connection for compactpro1.51.sea.hqx (229860 bytes).
226 Transfer complete.
229860 bytes received in 6.9 seconds (32 Kbytes/s)
ftp> binary
200 Type set to I.
ftp> get binhex4.0.bin
200 PORT command successful.
150 Opening BINARY mode data connection for binhex4.0.bin (7040 bytes).
226 Transfer complete.
local: binhex4.0.bin remote: binhex4.0.bin
7040 bytes received in 0.58 seconds (12 Kbytes/s)
```

It is not necessary to enter the **binary** command each time a binary file transfer is completed, as the example shows. However, it is a good habit that ensures the use of an appropriate mode of file transfer when accessing binary materials from FTP archives.

Because the *.sea* file extension on the *Compact Pro* file means that after it is un-*BinHex*ed it will become a self-extracting archive, you don't need to find anymore software. Now that you have copies (albeit encrypted and compressed copies) of all of the programs that you need, you can leave the FTP archive.

```
ftp> quit
221 Goodbye.
```

Many files at FTP archives that were compressed using *Compact Pro* are also self-extracting. This means that when you see a *.cpt* file extension, a part of *Compact Pro* may be automatically downloaded with the file itself. To see if this is true, just double-click on the file's icon after it is on your personal computer's hard drive. If *Compact Pro*'s file uncompression routine was downloaded with the file, it will open so that you can use it to expand the file.

Also, a growing number of uncompression/decrypting software packages can automatically process, in one step, files that have been compressed or encrypted with a number of different routines. Most notable among these is *StuffIt Expander* for the Macintosh and *PKUnzip* for DOS machines. It is a good idea, therefore, to try to uncompress and decrypt any file that you have downloaded with one of these combination tools before going out on the Internet again to acquire additional decryption or uncompression software. In this way, the number of steps that you will have to complete may be reduced.

Downloading and Decrypting the Software

It is now time to download the *GIF Converter*, *BinHex*, and *Compact Pro* programs from your Internet account space to your microcomputer. This is done slightly differently with each telecommunications package, but one aspect of all possible transfers is the same: binary files MUST be downloaded with a binary file transfer option. Also, if you are downloading binary files to a Macintosh, the MacBinary option in the telecommunications software must be selected, except when downloading *.hqx* or *.gif* files. The step-by-step procedures for downloading files to your microcomputer are different for every telecomputing package used. These can be obtained from the telecommunications software manual or from a helpful and knowledgeable colleague.

Once the files are downloaded to your microcomputer's hard drive or to a floppy disk, they must then be uncompressed. In the previous example, the *BinHex* program was transferred in a plain binary file, which, if it is downloaded with the MacBinary option enabled, can be used as an application with no further processing. The *BinHex* program can then be used to decrypt the *compactpro1.51.sea.hqx* and *gifconverter2.37.cpt.hqx* files, choosing the **Upload → Application** option from the **File** menu after *BinHex* is launched.

Once this is done, the *Compact Pro* file is ready to be self-extracted; this process can be started simply by double-clicking on the *Compact Pro* icon. Step-by-step instructions appear to assist in the self-extraction process. Finally, the extracted *Compact Pro* program can be used to uncompress the *GIF Converter* program, simply by double-clicking on the *Compact Pro* icon, highlighting the two files that comprise the *GIF Converter* program, double-clicking on that highlighted box, and selecting the **Extract** button. The *GIF Converter* program is now ready to use to view *.gif* files that can also be downloaded (but often don't need to be uncompressed) in binary format from FTP archives.

Viewing .gif Files in DOS

For DOS users, a powerful *.gif* file viewer called *Graphics Workshop* is available at: **wuarchive.wustl.edu** in the subdirectory path: *systems/ibmpc/simtel/msdos/graphics* in the file named: *grfwk70c.zip*.

It should be **ftp**ed with the **get** command, as you saw in the previous example, then downloaded to your microcomputer in binary file transfer mode. Because it is zipped (as the *.zip* file extension indicates), a program to *un*zip it also should be obtained and downloaded. One such program is stored in the execution file named *pkz204g.exe*, and is available at the Washington University archive (**wuarchive.wustl.edu**) in subdirectory path: *systems/ibmpc/simtel/msdos/zip*.

Because the file is already in executable form (as is indicated by its *.exe* extension), there is no need to download any more software to uncompress it before it can be used. It can be launched from the DOS prompt by typing **pkz204g**.

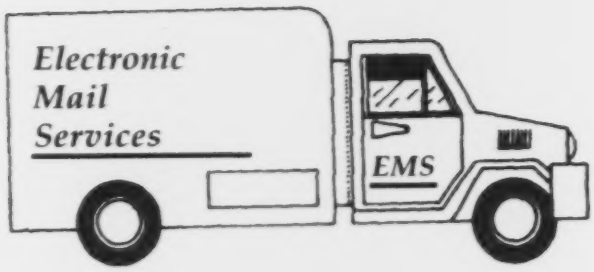
File Management Tips

You may be astonished after your binary software files are safely downloaded to your microcomputer's hard drive and uncompressed at how much information you have gathered. If you behave like many Internet users, after you have become comfortable with transporting and expanding compressed files, you may begin to fill disk after disk with software and other documents that you have gathered from FTP archives. For your own protection and convenience, follow these suggestions.

- Have an updated copy of an antiviral program running at all times on your microcomputer.
- Delete all compressed files from your Internet account space after you have downloaded them to your microcomputer.
- Delete all downloaded files from your hard drive or floppy disks that you will not use in the future (i.e., partially uncompressed files and software that you have seen, but don't prefer to use).
- Register any copies of shareware that you have **ftp**ed from file archives and plan to use regularly.
- Keep notes on the Internet addresses and subdirectory paths that you used to find the software that you plan to use regularly, so that you can check back periodically for software updates.

Section 2

Interpersonal Resources



Chapter 6
Electronic Mail Services

E-mail is probably the most well-explored telecomputing tool in instructional contexts at all levels. It has been used for projects ranging from comparative culture studies, to foreign language practice, to writers' workshops, to scientific data compilation and analysis. These projects help students to collaboratively explore everything from folk games as reflections of culture, to grammatical rules, to the use of metaphor in original poetry, to the severity of pollutants in different places along a common river.

Internet Address

Your Internet account has a unique address. Although the forms of Internet addresses vary, they are constructed similarly. Let's take a look at my Internet address as an example:

jbharris@leslie-francis.tenet.edu

Each part of the address is separated from the other parts by either a **.** (usually called a "dot") or an **@** (usually pronounced "at"). In the preceding example,

- **jbharris** is the username or account name.
- **leslie-francis** is the name of the machine on which the account is located. (On TENET, machines that hold accounts, or *servers*, are named after Texas Teachers of the Year.)
- **tenet** is the name of the regional node, or domain, on the Internet.
- **edu** is the name of the larger domain, or section, of the Internet in which this node exists. In this case, **.edu** indicates that **.tenet** is within the educational section of the Internet.

The Message

To communicate with anyone else on the Internet, all you need to do is send an e-mail message to their Internet address. Almost every machine that holds Internet accounts has one or more e-mail programs available. Although e-mail systems differ in the keystrokes that are used to compose and send messages, and in the specific features that are offered, all ask users to specify, by typing:

- the address of the person to whom the message will be sent
- the subject of the message
- the text, or contents, of the message

If an e-mail message is addressed properly, composed, and then sent correctly according to the operating instructions of the e-mail software being accessed by the user, a copy of the message will be sent to the e-mailbox of the addressee. It will wait there (much like an unopened letter sitting in the mailbox outside your home) until the addressee next accesses his or her Internet account, reads the message, and decides whether or not to respond.

Since different e-mail systems use different command sequences to send and reply to messages, we won't review the particular steps here. Please use the documentation that is available from your Internet provider to help you to learn these system-specific commands.

Requesting Files by Electronic Mail

The Internet is just a part of a much larger network of networks, called the Global Matrix. Many of the more than 30 million people with access to the Matrix (Quarterman & Carl-Mitchell, 1995b) can only use electronic mail because their Internet service providers do not yet support the use of any other telecommunications tools. Therefore, several helpful programs have been written to help us use electronic mail for more than interpersonal communication.

Electronic Teacher Contacts Lists

As yet, no comprehensive "electronic white pages" exist for the Internet. There are, however, four regularly updated lists of several hundred teachers with Internet access that can be sent to you at your Internet address. Sally Laughon, a teacher at North Cross School in Roanoke, Virginia, and Art St. George, a networking specialist at the National Science Foundation and the University of New Mexico, have made these *Teacher Contacts Lists* available to anyone requesting them. These lists contain names, electronic addresses, locations, and biosketches of several hundred elementary, middle, and secondary school educators, plus others interested in exploring Internet use in precollege

contexts. Many of the biosketches also list individual educators' online project ideas and requests for classroom partners.

E-mail can be used to request files such as these from some computers with Internet addresses. To request these four useful files, send an e-mail message to this Internet address:

listserv@unmvma.unm.edu

Leave the subject line of the message blank, and in the body of the message, type the following commands for the University of New Mexico's computer to execute.

get teacher1 contacts

get teacher2 contacts

get teacher3 contacts

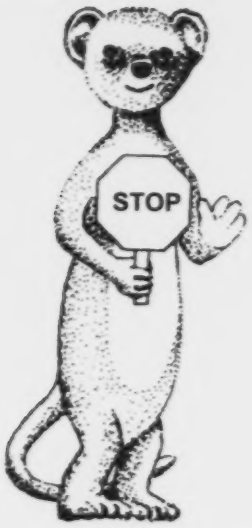
get teacher4 contacts

Send the message as you normally would send an e-mail message on your system. Within a day or two, you will receive four e-mail messages that contain long lists of people interested in using Internet-based telecomputing options for teaching, learning, and professional development. If you would like to add your name, address, location, and biosketch to the list, send an e-mail message to Sally Laughon at:

laughon@vtvm1.cc.vt.edu

Additional information on sending and receiving communications through listservs and newsgroups, collections of mailing lists, user directories, and ways to locate account holders appear in Chapters 7 and 8.

Transferring Files by Electronic Mail



Technical Note:

To understand what follows, it is necessary for you to have already worked through the material in Chapters 3, 4, and 5.

If you have decided that you are going to buy a new shirt, what do you do next? If you live near a store that sells the kind of shirt that you would like to buy, you would probably go to that store to make the purchase. You might go there by driving a car, by riding a bus or subway, by walking, or by asking a friend to take you there. What happens though, if you have no way to get to the store? If the shirt that you want is sold through a mail order catalog, you might order it and have it sent to your house.

Analogously, to execute file transfers on the Internet, your account has to have the FTP capabilities that permit you to do so. But there is good news for the holders of e-mail-only accounts! Although they cannot conduct interactive Telnet sessions or use Gophers, they *can* access World Wide Web pages and the contents of file archives and Archie servers by e-mail.

The FTP Gateway

The FTPmail Gateway is a free service available on the Internet that will execute FTP commands at any anonymous login site for you, then deliver the results to your e-mailbox. That service is accessed by sending an e-mail message to this address:

ftpmail@decwrl.dec.com

The text of the message that is sent here should contain commands that the FTPmail program understands and that direct it to locate and retrieve the

information you desire. For example, if you wanted to have a copy of a document that describes the Project Gutenberg effort (which provides full-text files for educational use) sent to your e-mail address, you could send a message similar to the following one.

```
Date: Thu, 31 Aug 1995 18:37:54 -0500 (CDT)
From: Judi Harris <jbharris@tenet.edu>
To: ftpmail@decwrl.dec.com
Subject: Project Gutenberg

connect uiarchive.cso.uiuc.edu
chdir pub/etext/articles
get NEWUSER.GUT
quit
```

Each line of the text of this message is a separate command for the FTPmail program to execute, in the order presented. Each line begins with a command that is followed by the input for that command.

- The **connect** command establishes the connection to the site whose address follows it. In this case, it is Project Gutenberg's primary FTP archive at the University of Illinois.
- The **chdir** command tells the archive's computer to switch to the subdirectory indicated by the path name that follows the command. In this case, it is the */articles* subdirectory, which is a subdirectory of */etext*, which, in turn, is a subdirectory inside */pub*.
- The **get** command retrieves the file that you have named. In this case, the file name for the Project Gutenberg New Users document is *NEWUSER.GUT*. Please note that you must type the file name exactly as it appears in the file listing at the archive, including, in this case, uppercase letters.
- The **quit** command tells the remote host (in this case, the Project Gutenberg computer) to end the session.

Several files can be ordered in the same e-mail message by using several **get** commands, changing subdirectories, if necessary, before each request. To request a listing of the files in any subdirectory include the **dir** or **ls** (list) command on a line by itself.

As soon as the request is received by the FTPmail program, a note acknowledging it is returned. The first part of the note that I received when I requested the Project Gutenberg file looked like this:

```
Date: Thu, 31 Aug 95 17:10:46 -0700
From: "ftpmail service on ftp-gw-1.pa.dec.com" <nobody@pa.dec.com>
Reply to: nobody@ftp-gw-1.pa.dec.com
To: jbharris@tenet.edu
Subject: your ftpmail request has been received [Project Gutenberg]

We processed the following input from your mail message:

    connect uiarchive.cso.uiuc.edu
    chdir pub/etext/articles
    get NEWUSER.GUT
    quit

We have entered the following request into our job queue
as job number 809914246.15561:

    connect uiarchive.cso.uiuc.edu anonymous -ftpmail/jbharris@tenet.edu
    reply jbharris@tenet.edu
    chdir pub/etext/articles
    get NEWUSER.GUT ascii

There are 763 jobs ahead of this one in our queue.

You should expect the results to be mailed to you within a day or so.
We try to drain the request queue every 30 minutes, but sometimes it
fills up with enough junk that it takes until midnight (Pacific time)
to clear. Note, however, that since ftpmail sends its files out with
"Precedence: bulk", they receive low priority at mail relay nodes.
```

Much like mail order done by surface mail, the convenience of having what you want delivered to you makes the process a bit slower than going and getting it yourself (i.e., directly accessing the Project Gutenberg file archive with an FTP command). In the meantime, the FTPmail program will tell you what it is doing to fulfill your request.

```
  -- Ftpmail Submission Transcript --
<<< connect uiarchive.cso.uiuc.edu
>>> Connect to uiarchive.cso.uiuc.edu as anonymous with
-ftpmail/jbharris@tenet.edu
<<< chdir pub/etext/articles
>>> Will chdir to <pub/etext/articles> before I do anything else
<<< get NEWUSER.GUT
>>> get NEWUSER.GUT ascii
<<< quit
>>> Done - rest of message will be ignored
>>> checking security of host `uiarchive.cso.uiuc.edu'
>>> host `uiarchive.cso.uiuc.edu' has IP addr [128.174.201.189]
>>> host `uiarchive.cso.uiuc.edu' is ok
  -- End of Ftpmail Transcript --
```

Here's your chance to apply what you have learned about the FTPmail Gateway in a slightly different context. Let's say that you would like to retrieve copies of

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K-12 educational project announcements that use telecommunications tools. There is an extensive collection of these projects available on one of the Virginia Tech servers, the address for which is:

ftp.vt.edu

The files are in this subdirectory:

pub/k12

The files begin with **projects.1**, and in early September 1995, progressed through **projects.14**. New files, similarly named, are added every few months.

Take a moment now to send an e-mail message requesting the file(s) that you would like to see. Remember to use a separate **get** command for each file that you request. These multiple requests can be typed into a single message, if you prefer to do it that way.

If all goes well, in a day or so, you will receive the files that you requested in a series of e-mail messages from the FTPmail program.

Archie by Electronic Mail

Remember Archie, the file-finding program that searches popular FTP sites that was introduced in Chapter 4? Its services are available via e-mail, also. Let's say that you were so delighted with the "smileys" produced through the direct Archie search in Chapter 4 that you would like to search for additional information on "ASCII art" with Archie. To do this by electronic mail, you would send a message to **archie** at the Archie server address of your choice. So, if I wanted to send an e-mail request to the Archie server at Rutgers University in New Jersey, I would address the message to:

archie@archie.rutgers.edu

(Additional Archie server addresses are listed in Chapter 4.)

The message should look something like this:

```
To  : archie@archie.rutgers.edu
Cc  :
Attchmnt:
Subject: ASCII Art search
----- Message Text -----

prog ascii-art
quit
```

Notice that the **prog** command, which tells Archie the portion of file names to use in the search, is inserted, along with the search term itself, in the text of the message, as is the **quit** command, which is optional, but a good idea to include. The words in the Subject: line of the header are more for your reference than for the Archie program to read.

When I submitted this request to the Rutgers University Archie server in early September 1995, I received a return message in a few minutes that listed many "hits," including several of the following subdirectories:

```
Date: Mon, 4 Sep 95 21:18 -0500
From: archie-errors@dogbert.rutgers.edu
To: jbharris@tenet.edu
Subject: archie [prog ascii-art] part 1 of 1

Host ftp.seas.gwu.edu   (128.164.9.5)
Last updated 02:00  5 Sep 1995

    Location: /pub/rtfm/alt
      DIRECTORY     drwxr-xr-x       512 bytes    09:54 11 Aug 1995    ascii-art

Host ccsun42.csie.nctu.edu.tw   (140.113.209.12)
Last updated 03:23 19 Aug 1995

    Location: /pub/FAQ/alt
      DIRECTORY     drwxr-xr-x       512 bytes    13:45 17 Aug 1995    ascii-art

Host ftp.std.com   (192.74.137.7)
Last updated 14:51 13 Aug 1995

    Location: /customers3/src
      DIRECTORY     drwxrwxr-x       1024 bytes   17:33 27 Apr 1995    ascii-art
```

These directories all contain the very informative and helpful "Frequently Asked Questions (FAQ)" file about creating and sharing ASCII art, called:

FAQ_-_ASCII_Art_Questions_&_Answers_(4.9_-_58_K)

Why don't you use your e-mail file retrieval skills to make a similar request to the Archie server of your choice? Once you have received the results of the search that you ordered, you can then request the file itself with an electronic mail message, using the FTPmail program described in the previous section of this chapter.

If you would like to see a more complete explanation of the commands available with this "Archie by e-mail" program, send a message to the server as described earlier, with the command **help** as the text of the message.

World Wide Web Pages by E-Mail

Believe it or not, it is even possible to retrieve Web pages with an e-mail-only account. Peter Flynn has made a remotely accessible program named *WebMail* available to folks who have Internet e-mail access, but no Web browser to use. It is an easy-to-use service. All that you need to take advantage of it is the URL of the Web site that you would like to explore and the address to which to send the WebMail request.

For example, if I wanted to see the contents of the University of Michigan's "Clearinghouse for Subject-Oriented Internet Resource Guides," an extremely helpful site maintained by Lou Rosenfeld, and I didn't have a WWW browser to use to do so, I could send an e-mail message to:

webmail@curia.ucc.ie

In the text of the e-mail message, I would use the command **GO** followed by the URL for the Clearinghouse. The message would look something like this:

```
To  : webmail@curia.ucc.ie
Cc  :
Attchmnt:
Subject:
----- Message Text -----

GO http://www.lib.umich.edu/chhome.html
```

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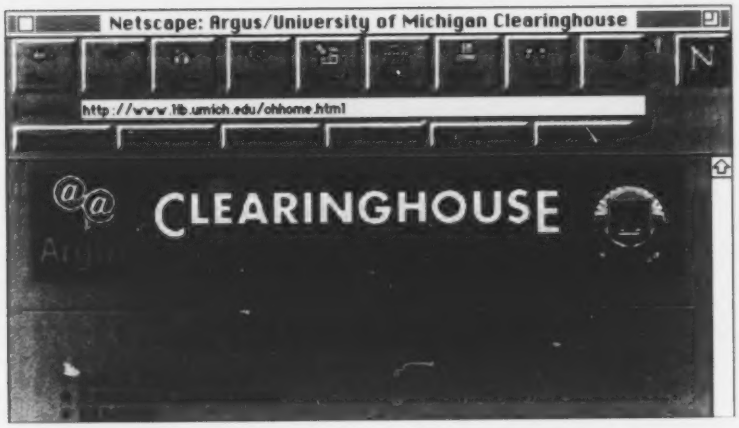
When I sent this request by e-mail in early September 1995, the return message included the HTML code for the Clearinghouse's main Web page, which began something like what you see in the following example. It took several days for this code to arrive by e-mail.

```
Date: 08 Sep 1995 22:06:22 +0100
From: WWW Mail Server <webmail@curia.ucc.ie>
To: jbharris@tenet.edu

[introductory material deleted]

In reply to your request:
GO http://www.lib.umich.edu/chhome.html

----------------------------------------------------------
<HTML>
<HEAD>
<!-- last update: 7/25/95 -->

<TITLE>Argus/University of Michigan Clearinghouse</TITLE>
<!-- given URL for this document: http://www.lib.umich.edu/chhome.html →
<base href="http://www.lib.umich.edu/chouse/chhome.html">
</HEAD>

<BODY>
<center>
<A HREF="/cgi-bin/imagemap/chouse/graphics/image.map">
<IMG BORDER=0 SRC="/chouse/graphics/clear1.GIF" ISMAP></A>
</center>

<P>

<HR>
<CENTER>
<a href="/chouse/docs/new.html">What's New</a> | <a
href="/chouse/docs/info.html">Clearinghouse Information</a> |
<a href="/chouse/docs/credits.html">Credits</a><BR> <a
href="/chouse/docs/ratings.html">Ratings
System</a> | <a href="/chouse/docs/submit.html">Submit a
Guide</a>  | <a href="/chouse/docs/feature.html">Guide of the Month</a>
</CENTER>

<UL>
<LI><STRONG><a href="/chouse/tree/artent.html">Arts &
Entertainment</a></STRONG>
<LI><STRONG><a href="/chouse/tree/busemp.html">Business &
Employment</a></STRONG>
<LI><STRONG><a href="/chouse/tree/edu.html">Education</a></STRONG>
```

It's important to note that since WebMail returns HTML code for each request, users must have downloaded a Web browser to use locally to view the page in a more understandable form. The part of the Clearinghouse page that previously displayed the code looks like the following screen shot when the file received via e-mail is downloaded and viewed with *Netscape*:



Using WebMail, if I wanted to view the pages that are linked to this page, I would have to send subsequent requests for each of the URLs that I wanted to explore that are contained in the HTML commands for the main page. (Please note that only one request can be made in each message sent to **webmail@curia.ucc.ie**.) For example, if I wanted to see what the "Education" resources page looks like, I would need to send another WebMail request for the following URL:

http://www.lib.umich.edu/chouse/tree/edu.html

This implies that the user already has some understanding of HTML, so, unlike the FTPmail program and the Archie-by-e-mail service, WebMail is probably not recommended for new "Internauts." To obtain complete information on the WebMail service, send a message to that same address that contains only the command **HELP** in the message text.

A similar WWW-by-e-mail service is offered at:

agora@w3.org

The procedure for requesting HTML code for WWW pages using this address is the same as what I've described previously, except that the command to include in the text of the message is **SEND**, rather than **GO**. The URL is specified in the same way as the WebMail service. So, for example, if you would like to receive the HTML code for the Web page that offers help for users of this service, send a note with this in its message text:

SEND http://www.w3.org/hypertext/www/agora/help.txt

The Internet is full of potentially helpful and interesting information. Using the processes presented in this chapter, you can arrange for some of that information to be delivered to you via e-mail.

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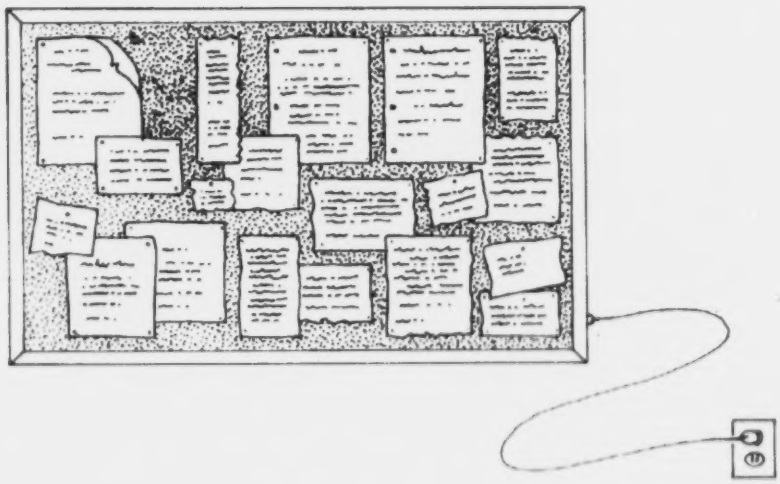

Chapter 7
Internet-Based Discussion Groups

If you have been exploring Internet resources using the chapters in this book in sequence, you have had an opportunity to sample the rich array of informational resources that are available for use in your classroom. The Internet boasts an even larger collection of interpersonal resources that can assist you and your students in teaching and learning.

The most obvious type of interpersonal resource available to you is direct communication with other teachers and students who, like you, have electronic accounts on computers directly connected to the Internet. This communication can occur in an asynchronous, one-to-one format, or among the members of a small group, using e-mail. Electronically supported discussion can be conducted privately with anyone anywhere in the world who has an Internet address. As long as each message is individually addressed to each person interested in participating in the discussion, an electronic forum for the exchange of ideas exists. (See Chapter 6 for more details on e-mail.)

But, suppose that you would like to pose a question or raise an issue publicly with a larger group of educators who have interests similar to yours, but whose Internet addresses you do not know. One way to interact with a larger group of people is to join one of two types of asynchronous electronic discussion groups available on the Internet: a mailing list or a newsgroup. Mailing lists are also

called distribution lists or listservs. Newsgroups are also called computer conferences or electronic bulletin boards, although these three terms actually describe slightly different services. One e-mail message sent to one mailing list address is copied electronically and distributed to each of the group's members, who usually number in the hundreds or thousands. An article posted to a newsgroup is electronically available to anyone on the Internet whose computing center receives the newsfeed for that group. Newsgroups can be distributed locally, statewide, regionally, or internationally. In both types of discussion groups, the person who reads the message or article that is posted publicly has an opportunity to respond publicly. Thus, a larger group of interested parties is addressed and can interact in a fashion more convenient and far-reaching than direct e-mail delivery.

Listserv Groups

A listserv is actually a computer program originally written by Eric Thomas. It resides on a mainframe, minicomputer, or workstation that is connected directly to the Internet, and it automatically manages an electronic form of a distribution list. Different listserv programs reside on different machines on the Internet; one program for each electronic distribution site. Different lists are organized for people with different interests, and currently thousands of these electronic Special Interest Groups (SIGs) are available for subscription. Of these, approximately 60 are lists that address topics related to elementary, middle, and secondary school education. All subscriptions to all listserv lists are free for the (electronic) asking.

Like any computer program, listserv programs respond to commands that users give them. These commands must be stated in terms that are within the program's limited vocabulary, and therefore must follow a specific format. Listserv commands are sent by e-mail. They can, among other functions:

- cause the listserv program to subscribe a new list member
- send an e-mail message to the subscriber containing the names of information files available to members of the discussion group
- send a copy of a file to a list member
- cause the listserv program to discontinue a member's subscription

All listserv discussion lists available by e-mail use the same set of list management commands. Other types of discussion lists will be overviewed later in this chapter.

Listserv Subscription

SIG/Tel is an ISTE Special Interest Group (SIG) for teachers interested in using telecommunications technologies in education. Many SIG/Tel members

communicate with each other using a listserv discussion list. Even though members of the SIG/Tel board live in Texas, California, Georgia, North Carolina, and Ohio, the listserv program for this e-mail discussion group is located on a mainframe computer at the University of New Mexico. (To Internet users, the world seems to be a very small place!)

The name of SIG/Tel's list is *SIGTEL-L*. To subscribe to the list, you must send an e-mail message to the *administrative address* for the list, which is **listserv@unmvma.unm.edu**. In the text part of the e-mail message, the **sub** command should be typed to cause the listserv to enter the e-mail address on the From: line into its collection of list subscribers.

My computer screen looks like the following example when I am composing a request for subscription to the *SIGTEL-L* list. Your e-mail facilities may look somewhat different from the interface that I use here in Texas, but the Internet address and commands that I sent to the listserv to subscribe will be the same for you. They appear in boldface in the following example.

```
PINE 3.91      COMPOSE MESSAGE      Folder:inbox 7 Messages

To: listserv@unmvma.unm.edu
Cc:
Attchmnt:
Subject:
--- Message Text ---

sub SIGTEL-L Judi Harris
```

The Subject: line of the message remains blank. The **sub** command must be followed by the list's name (*SIGTEL-L*), a space, and the full name of the person requesting a subscription to the discussion list.

Once this mail message is sent, it will take anywhere from a few minutes to a few days for the listserv program to respond to the request. When it does, the people requesting a subscription will receive one or more messages telling them that they have joined the discussion list, and providing helpful information about the information available through membership. These messages should be saved and downloaded for later use.

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Some lists accept all subscribers who request a membership. Others, like the now-unavailable *GLOBALED* list (which was also housed on one of the University of New Mexico's computers), require approval from the list's owners. Here is a message that I received a few minutes after sending a request for subscription to *GLOBALED* in late 1992.

```
Date: Tue, 24 Nov 1992 18:31:15 -0700
From: Revised List Processor <LISTSERV@unmvma.bitnet>
To: jbharris@TENET.EDU
Subject: Output of your job 'jbharris'

> sub globaled Judi Harris

List GLOBALED is not open for automatic subscription.
Your request has been forwarded to the list owner(s):
 Lani Gunawardena <LANI@UNMB.BITNET>
 "Leona P. Dvorak" <LEONA@UNMB.BITNET>
 Art StGeorge <STGEORGE@UNMB.BITNET>
 STGEORGE@UNMVMA.BITNET

Summary of resource utilization
-------------------------------

 CPU time:     0.382 sec    Device I/O: 100
 Overhead CPU: 0.036 sec    Paging I/O: 2
 CPU model:    9121         DASD model: 3380
```

List owners have the right to refuse membership in a discussion group to anyone who requests access who does not fall within membership policy parameters. It is rare for such a rejection to occur. List owners also have the right to refuse to approve messages that are sent to the list for distribution if the messages do not, in their opinion, pertain to the list's topic area(s). This is still an unusual, but a more common occurrence than membership rejection.

Any subscriber may post a message to the e-mail discussion group(s) to which they have subscribed. Each list has a *posting address* to use for sending messages to be distributed to the group at large. This address is different from the administrative address that is used for subscribing, unsubscribing, and other managerial functions. The posting address for a group usually begins with the name of the list and ends with the same domain path as the administrative address. Each list, then, has at least two addresses that its members use.

Thus, for SIG/Tel's list, use the following addresses.

posting address: **SIGTEL-L@unmvma.unm.edu**

administrative address: **listserv@unmvma.unm.edu**

Canceling Your Subscription

Once you are subscribed to a mailing list, you will begin receiving copies of all messages that are addressed to the group. This may be as few as 10 (or fewer) in

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6 months or as many as 80 (or more) per day. Some groups are more active than others, and all groups have variable electronic traffic at different times of the week or year. The most important idea to remember is that once you have subscribed to a listserv group, your e-mailbox will begin to fill up with a sometimes overwhelming number of messages that you must read and eventually delete. This necessitates daily checking of your e-mail, so that the task does not become overwhelming. (Can you imagine how long reading through a week's worth of listserv postings would take if you subscribed to a group that generated approximately 60 messages per day? Mitchell Waldrop, a contributor to *Science* magazine, likened this to attempting to drink from a fire hose.)

Probably the most important command that you could learn after subscribing to a mailing list, therefore, is the command that allows you to unsubscribe from the list. For most listserv groups, the **signoff** command will work. You send it to the same address that you used for subscribing, insert it into the text of the message, and follow it with the list's name. Here's how you would **signoff** from the very active (but very helpful!) *EDTECH* list.

```
PINE 3.91      COMPOSE MESSAGE      Folder:inbox 7 Messages

To: listserv@ohstvma.bitnet
Cc:
Attchmnt:
Subject:
--- Message Text ---

signoff edtech
```

After a while, the listserv program will generate a message confirming that your subscription to the list has been canceled, and you will stop receiving copies of messages that members send to the list.

While still subscribed, though, you can use the administrative address to request a list of files available through the group using the **index** *listname* command (i.e., **index edtech**), and have any of those files, including a help file, sent to you via e-mail using the **send** *filename* command (i.e., **send help**). Some lists have options in addition to these.

All in all, if you are an active, regular e-mail user with specific interests for electronic discussion, subscriptions to one to three mailing lists may provide you with helpful connections to persons with similar interests who also have Internet accounts. If you are not a frequent e-mail user, consider not subscribing to any mailing list, no matter how interesting the topics sound. By demonstrating that restraint, you will save yourself much future frustration, and your network administrator gray hairs and worry about how to expand the host computers' disk space for e-mail accounts.

Other Kinds of Mailing Lists

Listserv is one program that enables people to use mailing lists. There are other, similar programs that also work via electronic mail, but, in some cases, understand slightly different commands.

Majordomo, for example, is a program written by Brent Chapman that has been gaining in popularity during the past few years. You will know when a mailing list uses the Majordomo program because the administrative address will usually begin with **majordomo@**. For example, the **english-teachers** mailing list uses the Majordomo program. To subscribe to this list, you would send a message that looks something like this:

```
PINE 3.91      COMPOSE MESSAGE      Folder:inbox 7 Messages

To: majordomo@ux1.cso.uiuc.edu
Cc:
Attchmnt:
Subject:
--- Message Text ---

subscribe english-teachers
```

To unsubscribe from this list, your message would look something like this:

```
PINE 3.91      COMPOSE MESSAGE      Folder:inbox 7 Messages

To: majordomo@ux1.cso.uiuc.edu
Cc:
Attchmnt:
Subject:
--- Message Text ---

unsubscribe english-teachers
```

A full list of Majordomo commands can be requested by sending a message to any Majordomo location with the single word **help** in the message text. The same is true for a listserv. The primary difference between lists that use the listserv program and lists that use the Majordomo program is that many of the listservs are interconnected among different host computers, and the Majordomo programs are not. This advantage will make it easier for you to find listservs of interest to you, as is described in the next section.

Finding Mailing Lists of Interest

A collection of some of the mailing lists that are of specific interest to K-12 educators is included in Appendix 5. In each case, the list's name is printed first, followed by a brief description of the discussion topic(s) to which the list is

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geared. Two e-mail addresses are printed for each list. The first is the list's posting address, and the second is the list's administrative address.

This information was obtained electronically from two different list-searching services that are available on the Internet. One is based on the World Wide Web. (More information on the Web is included in Chapter 2.) The page located at this URL:

http://www.nova.edu/inter-links/cgi-bin/lists

allows fast and convenient keyword searching of more than 5,900 different mailing lists.

If a Web browser is not conveniently accessible to you, a search of available listserv lists is obtainable by electronic mail. To do this, send an e-mail message to:

listserv@listserv.net

Leave the Subject: line of the message blank. In the text of the message, tell the listserv program to find lists by supplying it with a keyword. The format for this command is:

list global/*keyword*

Instead of typing the word "keyword," though, choose a word that might bring you names of lists with information that will be helpful and interesting to you. For example, if you are interested in lists that address K-12 issues, type:

list global/K-12

Search results for this keyword in early September 1995 yielded 23 different mailing lists.

Network Newsgroups

Some Internet sites have a different kind of electronic discussion available to those people with Internet-accessible accounts. Network newsgroups, often called Usenet News, are public discussions on more than 10,000 different topics that are shared freely among Internet sites that offer this resource. (Some Internet sites do not have the facilities or personnel to offer these services to account holders.) Using newsgroups, single copies of articles are stored in a publicly accessible place, rather than distributing hundreds of copies of individual articles to e-mailboxes, as is done with mailing lists.

Using newsgroups, people from all over the world can discuss topics of mutual interest without having to wade through piles of electronic messages that arrive

in their e-mailboxes. Articles and responses to articles that are posted to each newsgroup are read at each participating Internet site with a program called a newsreader. Newsreader programs allow users to read what others have written, respond publicly or privately to the article's author, and post new ideas, questions, or requests to the newsgroup. Each newsreader program presents a different set of commands and screen appearance to the user, but all newsreaders can access the same newsgroups. (My favorite newsreaders are Tin and Tass.) Your network administrator can tell you whether your Internet site supports newsgroup participation and if so, how to access it. This person might also be willing to install a different newsreader than the one(s) already offered at your site, if you find the currently supported readers too difficult to use in comfort. This is a possibility because most newsreaders that are installed on host computers are freeware.

Newsgroups can also be created and supported locally, so that interaction among people at a particular Internet site is facilitated without having to share newsgroup postings with the rest of the Internet. Here at the University of Texas in Austin, for example, we are using 15 local newsgroups (with different topic assignments) to conduct an online course for educators interested in learning to mine the Internet and successfully integrate use of telecomputing resources into their teaching. The newsgroups are used for sharing information, planning collaborative projects, discussing telecomputing issues, and providing feedback on telecomputing resources created for teacher use.

Newsgroups for Educators

Of the more than 10,000 global newsgroups available Internet-wide, a small group currently provides forums designed specifically for K-12 teachers. Brief descriptions of some of the most popular of these groups are included here.

The source for this information was posted for anonymous FTP access at: **pilot.njin.net** in the subdirectory path: *pub/Internet-course* in file: *enews.lst*, which listed network newsgroups and brief descriptions of their purposes in early 1994. Unfortunately, this file was not available at the same site in September 1995. The contents of these newsgroups are not censored; they are unmoderated discussions. So, while free speech is supported in these public forums, the content may, at times, be off-topic or repetitive.

Global Newsgroups Related to Education

alt.education.disabled
Learning experiences for the disabled.

alt.education.distance
Learning via distance education.

alt.education.research
Educational research results and discussion.

comp.ai.edu
Applications of artificial intelligence to education.

comp.edu
Computer science education.

comp.lang.logo
Uses of the computer language Logo.

k12.ed.art
Art curriculum in K-12 education.

k12.ed.business
Business education curricula in grades K-12.

k12.ed.comp.literacy
Teaching computer literacy in grades K-12.

k12.ed.health-pe
Health and physical education curriculum in grades K-12.

k12.ed.life-skills
Home economics and career education in grades K-12.

k12.ed.math
Mathematics curricula in K-12 education.

k12.ed.music
Music and performing arts curricula in K-12 education.

k12.ed.science
Science curricula in K-12 education.

k12.ed.soc-studies
Social studies and history curricula in K-12 education.

k12.ed.special
K-12 education for students with handicaps or special needs.

k12.ed.tag
K-12 education for talented and gifted students.

k12.ed.tech
Industrial arts and vocational education in grades K-12.

k12.lang.art
Language arts curricula in K-12 education.

k12.lang.deutsch-eng
Bilingual German/English practice with native speakers.

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Global Newsgroups Related to Education (cont'd)

k12.lang.esp-eng
Bilingual Spanish/English practice with native speakers.

k12.lang.francais
Bilingual French/English practice with native speakers.

k12.lang.russian
Bilingual Russian/English practice with native speakers.

k12.library
Library and information specialist discussion and resources.

k12.news
General news relevant to K-12 education.

misc.education
Discussion of the educational system.

sci.edu
The science of education.

SCHLnet Newsgroups

A collection of more than 40 K-12 newsgroups (called SCHLnet) is available from the Global SchoolNet Foundation (formerly the FrEdMail Foundation), a not-for-profit organization that has supported educational telecomputing for K-12 teachers and students since the early 1980s. Unlike the newsgroups listed previously, which are freely available to Internet sites willing to support network news services, SCHLnet is moderated by educators and therefore is available in exchange for a fee. Network administrators can request an electronic order form and the full sheet of terms, conditions, and fees for carrying SCHLnet groups by sending e-mail to Al Rogers at: **arogers@gsn.org**.

SCHLnet's Global Newsgroups

CALLS - Calls for collaboration, requests for project partners and sister schools, and keypal requests. These teacher-developed projects will have students measure, collect, evaluate, write, read, publish, simulate, hypothesize, compare, debate, examine, investigate, organize, share, and report.

NEWS - News and information on a variety of topics, including America 2000 Daily Report Card, CNN Newsroom Daily Lesson Plans and Democracy in America, and other publications and announcements for educators.

SIG - Special Interest Groups and discussion forums on a variety of general interest issues.

CURR - Curriculum Interest Groups, similar to SIGS but specific to curricular themes.

PROJ - Current and Recent Classroom Projects. Ongoing network-wide projects will be conducted in this area, so that all participants may peek at the progress of a project and new participants may choose to join.

PUB - Publications of various sorts, including the electronic publishing of the best of student work. Teachers supervise the selection and posting of only the *best* of student work. Other electronic publications from around the Internet will also be posted here.

STU - Various student topics/exchanges. This is the place for students to correspond with one another. Moderators encourage appropriate and timely discussions on a variety of topics.

Newsgroups via Gopher

If your Internet service provider doesn't offer its users Internet-wide newsgroups to read, you can still access the many postings to these groups via several Gophers that archive newsgroup articles. Please note that these servers do not allow *posting* articles to newsgroups. Also, the caretakers of these sites strongly request that you use Gophers to read newsgroup articles only if you have no other way to access this kind of Internetworked information. (More on Gophers is included in Chapter 1.)

The following Gopher sites make newsgroup articles available to electronic visitors.

Gopher address	Submenus to Choose
gopher.msu.edu	News & Weather, then USENET News
gopher.ccu.edu.tw	Internet Resources, then UseNet News
gopher.ictp.trieste.it	USENET News
saturn.wwc.edu	USENET News via gopher

At one time, people with no direct newsgroup access could post articles using an electronic mail service called Mail2news. As of September 1995, though, no servers that supported this service were found that would post articles to the

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previously listed k12.xxx newsgroups. Therefore, it appears that if your service provider does not offer news services, you cannot participate in Internet-wide discussions on K-12 oriented newsgroups. (Perhaps you could see this as one way to limit your feelings of information overload!)

Newsgroups Containing Mailing List Postings

Compared to mailing lists, network newsgroups offer superior disk-space-saving, time-efficient ways for educators to communicate with each other. If, for example, 10 people with Internet accounts at the same site subscribe to the same mailing list, 10 copies of each message that is distributed through that group have to be stored on the site's computer before being read and deleted by each of the 10 account holders. It is easy to imagine how quickly this problem can escalate if many users at the same site subscribe to many mailing lists.

One way to alleviate the problem of ever-expanding disk storage needs is to create newsgroups to make mailing list postings available to Internet users. The following is a list of several education-related listserv groups that have already been programmed to send their distributed messages to Internet-wide newsgroups.

Listservs Programmed to Post to Internet-Wide Newsgroups

```
bit.listserv.edpolyan
 Professionals and students discuss educational administration.
bit.listserv.edstat-l
 Statistics education discussion list.
bit.listserv.edtech
 EDTECH - Educational technology (moderated).
```

Similar newsgroups can be created locally. This process is strongly recommended both by discussion group participants (because it drastically decreases the amount of time that it takes to read postings) and network administrators (because it saves much disk space). With this plan, only one copy of each article for each discussion group must be stored on the site's computers. Those copies can then be accessed by as many account holders as necessary. Therefore, if there is a mailing list that you would like to follow, please check first with your network administrator about the availability of the list as a local or global newsgroup.

Electronic discussion groups are among the most powerful teaching/learning tools that are available on the Internet. With them, information is more than electronically accessible; it is created and shared in an internationally cooperative context.

Chapter 8
Finding Folks on the Internet

By the time you read this sentence, more than 13 million people will have electronic accounts with which they can access the Internet. Of these, perhaps 0.5% are elementary, middle, or secondary school teachers. At first glance, this may seem like a disappointing minority. Yet, 0.5% of 13 million is 650,000 teachers! This number is more than enough for organizing student-to-student projects, professional development, and other kinds of electronic educational support.

"But," you may ask, "How do I find these folks? Is there an Internet user directory?" The answer: yes and no. The Internet is actually not just one network. It is an interconnected system comprised of networks of networks (of networks of networks...) that encircle the globe. This complicated set of interconnections is growing at about 5% per month. Therefore, a single, comprehensive user directory would be difficult to establish and maintain.

Nevertheless, several user directories (and directories of directories) are accessible online for your use. This chapter will introduce them to you and situate them within the larger context of accessible user information on the Internet.

Fingering Information

Finding an account holder on your local system is fairly easy. If the Internet node to which you connect locally is written in a Unix or similar-style operating system (as most are), then the **finger** command can be used at the system prompt.

Suppose I wanted to find the username for Gerald Knezek, a professor of educational computing at the University of North Texas in Denton, Texas. Because my Internet account is in the statewide Internet domain called TENET, using the **finger** command from my account with someone's name will yield information about users on TENET only.

The **finger** command, typed at the system prompt, should be followed with either the first or last name of the person whose e-mail address you are seeking. To find Gerald's address, then, I could type:

```
System> finger knezek
```

122

When I did this, TENET's computers returned brief information files on seven TENET account holders whose names are Knezek. The first four are included here.

```
Login name: melayne
In real life: Melayne Montgomery Knezek
Directory: /tenet/u4/melayne
Shell: /bin/hook
Never logged in.
No Plan.

Login name: gknezek
In real life: Gerald Knezek
Office: U. North Tx, (817) 565-4195
Home phone: N/A
Directory: /tenet/u11/gknezek
Shell: /bin/hook
Last login Tue Jul 27 15:42 on ttyp3 from System196.cecs.u
No Plan.

Login name: donk
In real life: Don Knezek
Directory: /tenet/u5/donk
Shell: /bin/hook
Last login Fri Dec 11, 1992 on ttyq1 from Austin2.ts.tenet
No Plan.

Login name: janaknez
In real life: Jana Knezek
Office: East Centra, (512) 648-7861
Home phone: Library Coordinator
Directory: /tenet/u4/janaknez
Shell: /bin/hook
Last login Sun Jun 27 17:57 on ttyrh from lita-10.ALA.DRA.
No Plan.
```

The entry, "No Plan.", does not mean that these folks fail to plan ahead! Instead, account holders on a Unix-based system have the option to create a file in their account spaces named *.plan* that will display a short public message when their names are **finger**ed. A similar option creates a file called *.project*. (More on this later.) These folks have simply not chosen to create either file.

As you can see, the address for which I was searching was successfully found: **gknezek**. Because Gerald's account resides on the same system as the one that I use for Internet communication, when I address e-mail to him, I need only insert his username, **gknezek**, into the address line of a new e-mail message.

Finger can also be used to find the electronic address of someone who has an Internet account on a Unix machine, but who is not necessarily on the same system as the person seeking the information. To use this **finger** feature, enter a name for a user, followed by the Internet domain path for the machine on which their account is stored.

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For example, if I wanted to find the login name for my friend and research partner, Neal Grandgenett, who is a professor at the University of Nebraska in Omaha, I would type the following.

```
System> finger grandgenett@cwis.unomaha.edu
```

When I did this, the system in Nebraska sent user information about three Grandgenetts on the UNO system, including Neal, his father, Don, and another Grandgenett with an electronic account there.

```
[cwis.unomaha.edu]
Login name: dee
In real life: Dana M. Grandgenett
Directory: /ul/dee
Shell: /usr/local/bin/tcsh
Last login Thu Nov 19, 1992 on ttys1 from cba401.unomaha.e
No Plan.

Login name: dgrand
In real life: Don Grandgenett
Directory: /ul/dgrand
Shell: /usr/local/bin/tcsh
Last login Fri Sep 3 13:25 on ttypd from kh522f.unomaha.e
No Plan.

Login name: grandgen
In real life: Neal Grandgenett
Directory: /ul/grandgen
Shell: /usr/local/bin/tcsh
Last login Fri Sep 3 12:34 on ttys2 from kh107a.unomaha.e
No Plan.
```

Although I requested user information with Neal's full name, **grandgenett**, the computer at the University of Nebraska indicated that his login name on that system is **grandgen**. That means that when I send e-mail to Neal, I should address it to: **grandgen@cwis.unomaha.edu**.

The **finger** command can also be used to find out who is currently using a particular system, by specifying the full Internet domain path name without a username. For example, I could find out who is using the **cwis.unomaha.edu** machine at 6 pm on a Friday evening by typing this command.

```
System> finger @cwis.unomaha.edu
```

Fortunately, most of the account holders at the University of Nebraska in Omaha are not online on a Friday evening. The computer showed only 17 users in response to my **finger**ed request for information.

```
[cwis.unomaha.edu]
Login     Name                    TTY     Idle    When        Office
ed        Ed Stastny              03              Fri 17:47   SOUND N&A 551-0315
hominid   Eric R. Lindahl         05      1:14    Fri 13:31
orion     Jeff M. Beisch          07              Fri 16:06   In Ovo Go Away!
rwarner   Robert Raymond Warner   *09             Fri 17:22
mohamad   Mohamad Fadlallah       p23             Fri 17:15   AlumniHouse xx411
scotsman  Kraig M. Downey         *p4             Fri 17:42
sfitzger  susan e fitzgerald      *p5             Fri 17:50
jerichse  Jeff Erichsen           p6              Fri 17:53
rhunter   Roxanne Marie Hunter     p7              Fri 17:52
pschleck  Paul W Schleck KD3FU    p9              Fri 17:09   DSC 326 (402) 291-6176
mgraham   Michael J. Graham       pb              Fri 17:48
dsopscak  David L. Sopscak        *pd             Fri 17:10
mad-celt  Andy Booth              pe              Fri 17:50
jrodrigu  James Philipe Rodriguez pf              Fri 17:51
dmoore    David Moore             *q2             Fri 17:29
jfrederi  Jon P. Frederickson     *qc             Fri 16:00
hwolfe    Herbert L. Wolfe        se              Fri 12:20   CBA 007
```

Several other services are available if you want to find the e-mail address of someone for whose account you don't know the Internet domain path.

Interactive User Directories

There is, as yet, no comprehensive directory of Internet account holders or anything that indexes even 35% of all users. Whois, a directory of about 70,000 long-time account holders, was originally established before the Internet emerged: when it was primarily a U.S. military network called ARPANet. Whois databases still exist online, but not many educators are referenced in them. Fred, an interface for a collection of user databases that are still being tested and refined (called X.500 databases), is available at a few Internet sites; but the commands needed to access it can be confusing.

Netfind User Lookup is an online service that, when given an account holder's surname, school, or organization name and city, uses the **finger** services (if available) for a list of Internet domain paths to find individual user addresses. Netfind can be accessed by establishing an interactive connection (using the **telnet** command) to any one of more than 15 sites and logging in with **netfind**. Five of the more popular sites are listed here.

Popular Netfind Sites

```
bruno.cs.colorado.edu
mudhoney.micro.umn.edu
ds.internic.net
netfind.oc.com
macs.ee.mcgill.ca
```


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At this time, Netfind searches can be frustrating, even though clearly written, menu-driven help files are easily accessed online at each of the sites. Many of the machines listed in the domain path database that Netfind uses do not support **finger** services. Also, Netfind asks users to make one, two, or three selections from an often long list of possible domain paths in a particular city so that it can search for users with the previously specified surname. In many cases, the user does not have information to make those selections accurately. The potential usefulness of Netfind services probably rests in its future forms.

A simpler, friendlier, and (unfortunately) less comprehensive user-location service is called the Knowbot Information Server (KIS). The KIS searches Whois, X.500, and other, less common user information services automatically when the user enters the name of a person, organization, service, or country. To access KIS, an interactive (Telnet) connection must be established to the KIS server. (For information on how to use the **telnet** command, see Chapter 3.)

When you connect to the Knowbot, you must include the port number (185) with the Internet address to access the service.

```
System> telnet regulus.cs.bucknell.edu 185
Trying 134.82.20.31...
Connected to regulus.bucknell.edu.
Escape character is '^]'.
Knowbot Information Service (V1.0). Copyright CNRI 1990. All Rights Reserved.
Try ? or man for help.
>
```

Once connected, you can enter the name of a person you would like to locate. Suppose that you wanted to find a listing for Al Rogers, of FrEdMail fame. You would simply type:

```
> Al Rogers
```

and in a few minutes, KIS returns:

```
Name:           Al Rogers
Organization:   FrEdMail Foundation
Address:        P.O. Box 243
City:           Bonita
State:          CA
Country:        US
Zip:            92002-0243
Phone:          (619) 475-4852
E-Mail:         alrogers@cerf.net
Source:         whois@nic.ddn.mil .
Ident:          AR157
Last Updated:   20-Feb-91.
```

126

There are probably more people who are active on the Internet who are *not* listed within the database services that the Knowbot accesses than those who are. Suppose, for example, that someone wanted to use KIS to locate me:

```
> Judi Harris
>
```

The blank space after the second > indicates that none of the directory services accessed by KIS had a listing for me. Typing **exit** will allow you to disconnect from the Knowbot so that you can try another type of interactive user directory.

An Asynchronous User Directory

The folks at the Massachusetts Institute of Technology (M.I.T.) have a user identification service that works a bit differently than the interactive resources described previously. M.I.T.'s Usenet User List service will search through all of the account holders who have recently posted an article to an Internet-wide newsgroup, and if the person that you're looking for did, the service will return the address, listed name, and date of posting(s) by e-mail. To use this service, address a new e-mail message to: **mail-server@pit-manager.mit.edu.**

In the text of the message, include a single line that starts with a command that the mail-server program understands, and ends with the surname of the person whose address you are seeking. For example, if you wanted to find the address for Gleason Sackman, the dedicated information scout who brings news of new Internet services to the many who subscribe to the lists that he moderates, you would type the following command into the text of an e-mail message that you send to the mail-server program at M.I.T.

```
send usenet-addresses/sackman
```

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Approximately two hours after I sent a message containing this command, my response arrived by e-mail.

```
Date: Fri, 3 Sep 93 19:51:35 -0400
From: mail-server@CHARON.MIT.EDU
To: Judith Harris <jbharris@tenet.edu>
Subject: mail-server: 'send usenet-addresses/sackman'

---cut here---
Gleason Sackman <sackman@PLAINS.NODAK.EDU>          (Aug 11 93)
Gleason Sackman <sackman@plains.nodak.edu>          (Aug 3 93)
Gleason Sackman <sackman@PLAINS.NODAK.EDU>          (Aug 3 93)
Gleason Sackman <sackman@plains.nodak.edu>          (Aug 12 93)
sackman@plains (Gleason Sackman)                    (Jul 9 93)
sackman@plains.nodak.edu (Gleason Sackman)          (Mar 21 93)
Gleason Sackmann <sackman@sendit.NoDak.edu>         (Apr 11 93)
sackman@sendit.NoDak.edu (Gleason Sackmann)         (Mar 21 93)
sackman%plains.nodak.edu@CUNYVM.CUNY.EDU            (Oct 11 92)
---cut here---
```

This told me that Gleason had posted articles to Internet-wide newsgroups at least nine times during the past year. The mail-server program found four different versions of Gleason's two electronic addresses in its scan of Usenet newsgroup postings.

Fingering Other Information

The **finger** command can also be used to access and display short informational texts that are attached to electronic accounts on Unix-based systems. The contents of files entitled *.plan* and *.project* in an account's home directory can be displayed by **finger**ing the account owner's e-mail address. The following shows two good examples of helpful information that Scott Yanoff, who maintains an extremely useful and informative, updated-monthly list of Internet resources, has made available through his *.plan* and *.project* account files. When you type:

```
prompt> finger yanoff@alpha2.csd.uwm.edu
```


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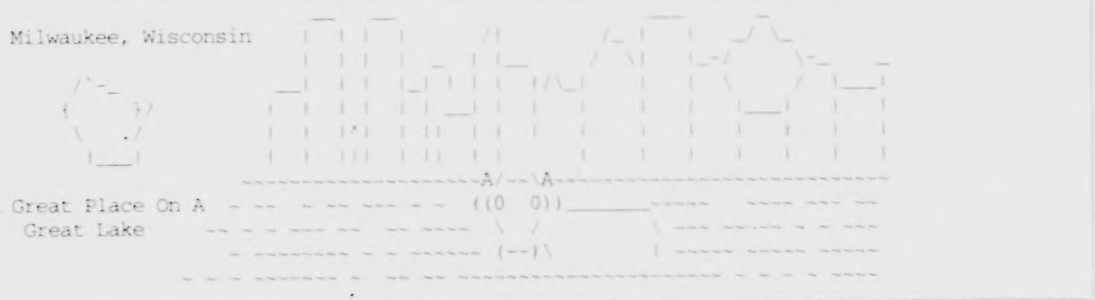
the system returns:

```
[alpha2.csd.uwm.edu]
Login name: yanoff                          In real life: Scott A Yanoff
Office: EMS E212, x5980                     Home phone: 961-9917
Directory: /usr/uy/yanoff                   Shell: /usr/local/bin/tcsh
Last login Wed Sep 13 23:29 on ttyu3 from ems-ts5.csd.uwm.
Project: Wednesday 5/2:  BREWERS: 7  Orioles: 4  Winner: Kiefer (3-0)
Plan:
* As the author of the INTERNET SERVICES LIST, I have made updates
   available in a number of ways:     (Available 1st and 15th of every month)
     1) newsgroup alt.internet.services
     2) ftp ftp.csd.uwm.edu  (get /pub/inet.services.txt) (Login: anonymous)
     3) gopher gopher.csd.uwm.edu (select Remote Information Services...)
     4) mail inetlist@aug3.augsburg.edu  (Auto-replies with lists)
     5) URL: http://www.uwm.edu/Mirror/inet.services.html (for WWW, Mosaic)
```



There are many types of information that can be **fingered** on the Internet. For example, a daily almanac of events is offered at **copi@oddjob.uchicago.edu**, including births, deaths, and sports games schedules. When I **fingered** these files on September 14, 1995, I received several screens of information, including the following:

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```
Information for today:

                                Thursday
                            September 14, 1995

                        Day 257 and Week 37 of current year
                        102 shopping days until Christmas

                                Day 19 of Elul, 5755
                            Year 17 of Machzor 302
                        95 shopping days until Chanukah

For Chicago (CDT)
                        Sun rise: 6:29 AM, set: 7:03 PM (today)
                    Sun rise: 6:30 AM, set: 7:01 PM (tomorrow)

                                Phase of moon: last quarter
                            Age of moon: 9 days (to next new moon)

                                The year of the Pig

*************************** Special Events for 9/14 ***************************
*********************** Birth: Lao Tzu (2598 years ago) ***********************
***************** Birth: Ivan Petrovitch Pavlov (146 years ago) ***************
************ Birth: Clayton Moore (the Lone Ranger) (81 years ago) ************
****************** Death: William McKinley (94 years ago) ******************
******************** Death: Isadora Duncan (68 years ago) ********************
************* Event: Salem, Massachusetts founded (366 years ago) *************
***** Event: 1st lighthouse in US was lit (Boston Harbor) (279 years ago) *****
*** Event: Benjamin Franklin sent to France as US minister (217 years ago) ****
**** Event: F S Key wrote words to "Star Spangled Banner" (181 years ago) *****
************** Event: Typewriter ribbon patented (109 years ago) **************
******* Event: 1st automobile fatality (Henry Bliss, NY) (96 years ago) *******
**Event: Selective Service Act established 1st peacetime draft (55 years ago)**
*******************************************************************************

Please email me (copi@oddjob.uchicago.edu) event (mm/dd/YYYY) information
to add to my list
```

Recent earthquake information, solar activity, tropical storm forecasts, NASA press releases, and trivia contest questions and answers also can be **finger**ed on the Internet with the following commands.

Finger Commands

```
finger spyder@dmc.iris.washington.edu   (earthquake information)
finger solar@solar.uleth.ca             (solar activity)
finger forecast@129.82.107.24           (Atlantic Ocean storms)
finger nasanews@space.mit.edu           (NASA press releases)
finger cyndiw@magnus1.com               (trivia question contest)
```

Finally, some **finger**s are just for fun. The contents and temperature of soft drinks and other snacks in vending machines at universities can be ascertained by **finger**ing several addresses. We will use the **coke@cs.wisc.edu** address as an example.

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On the day that I was writing this part of this chapter, the sodas looked plentiful, and I was thirsty.

```
Plan:
Sat Sep 4 19:36:30 1993
M&M validity: 9
Coke validity: 9
Exact change required for coke machine.
   M & M                              BUTTONS:
   /---\              C: ???????????
   |   |              C: CCCCC.......       D: ???????????
   |   |              C: CCCCCCCCCC..       D: CCCCCCC.....
   |   |              C: CCCCCCCCCCC.       D: CCCCCCC.....
   |***|                                C: CCCCC.......
   \---/                                S: CCCC........
     |          KEY:
     |          0 = warm;  9 = 90percent cold;  C = cold;  . = empty
     |          Leftmost soda/pop will be dispensed next
   __'__
```

Of course, the machine for which I **finger**ed information was installed at Carnegie-Mellon University, in Pittsburgh, Pennsylvania, and I was sitting in my office in Austin, Texas. (How did I find out where the machine was located? I used the Netfind service mentioned earlier in this chapter!) I guess sometimes the information that one wants is more than just a finger-press away.

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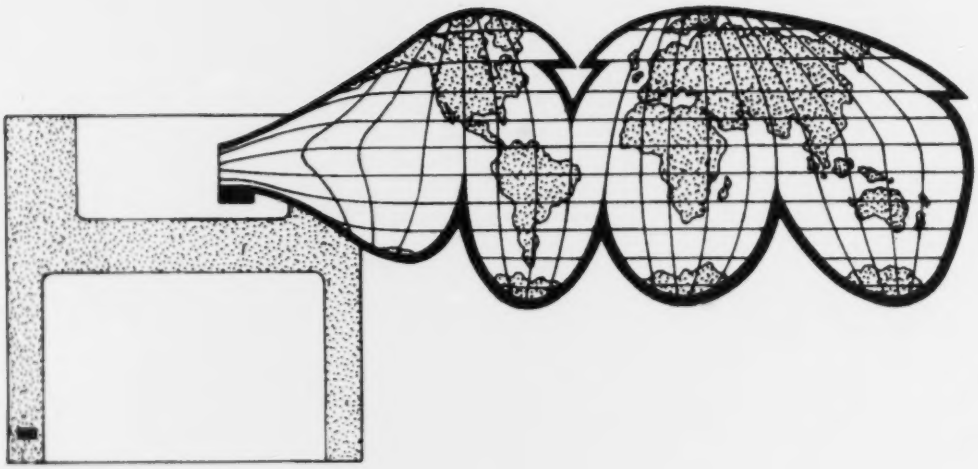
Section 3

Educational Applications



Chapter 9
Telecollaborative Educational Activities

As the previous chapters have shown, your telecommunications account allows you to access an almost inconceivable amount and variety of online information. In mid-1995, for example, there were more than 3 million hosts (computers with unique addresses that allow users access to online services) on the Internet, and more than 27 million people in 165 countries who could exchange electronic mail with each other (Quarterman & Carl-Mitchell, 1995a; 1995b). Within this vast array of possible connections, there are basically two ways that information can be shared online: *among people* and *between people and remotely located machines*.

Internetworked computers can house publicly-accessible databases, file archives, and virtual environments. I call these *informational resources*. When using an informational resource, you are actually interacting with a computer program, using it to help you to locate and collect information. Computers on the Internet can also house user accounts, with which account-holders can communicate either privately or publicly with other users, sharing information person-to-person. The tools that allow us to make such interpersonal connections can be seen as *interpersonal resources*.

Both informational and interpersonal resources can be used to help students explore curricularly related topics in precollege classrooms. The previous nine chapters helped you ferret out informational and interpersonal educational resources on the Internet. As you read those chapters and explored the Internet services they described, those of you who are teachers may have wondered how to effectively integrate use of such informational and interpersonal riches into your students' academic explorations. This chapter will help you plan for that integration by presenting 18 different types of cooperative educational telecomputing activities.

Many of those who roam the Internet are idea collectors. They are intrigued by the notion of a functioning, decentralized, democratic, and geographically unbound system that encourages the free exchange of thought. They tend to fill disk after disk with files from FTP archives, newsgroup postings, Gopher and WWW documents, and listserv messages containing information that they believe can be used or shared. (Whether or not that actually happens depends mostly on the extent of their organizational skills ... and the capacity of their hard drives!)

When I engage in electronic ferreting, I collect ideas on how to use telecomputing tools in educational contexts; specifically, the structures of online educational activities. I've sorted through my many files of Internet-based activity ideas and classified them into 18 structural categories. I've further grouped these structures into Interpersonal Exchanges, Information Collections, and Problem-Solving Projects genres. Each category is presented with sample project descriptions. It is my hope that by providing you with activity structures, rather than a potpourri of lesson plans, you will be empowered to design effective educational telecomputing experiences for your students that are curriculum-based and adapted to suit their particular learning needs and preferences.

Interpersonal Exchanges

The most popular type of educational telecomputing activity is one in which individuals talk electronically to other individuals, individuals talk to groups, or groups talk to other groups. Because all teachers with Internet access can use e-mail, many of these project types employ e-mail (sometimes via listserv discussion groups) as the common context for exchange. Other teachers and students use newsgroups and Internet-connected bulletin boards for projects such as the following ones.

Keypals

This was the first commonly used telecomputing activity structure, similar in form to surface-mail pen-pal activities. Students participating in activities that are formed according to this structure are usually paired off to communicate with each other electronically, and the topics that they discuss are often suggested by the students themselves.

One class from Iceland, for example, posted an open invitation on a listserv group, outlining their plans for electronic cultural exchange based on a study of Europe.

```
Date: Tue, 2 Feb 93 19:34:10 GMT
Subject: Europe: An Icelandic Perspective

Dear teachers: Grandaskoli in Reykjavik, Iceland, has 460 students who are 6 to 12 years
old. The 12-years olds are now (25 Jan) working on the subject 'Europe, our continent'
until the first of April. To help the students get a better view of the day-to-day life in
these countries, their teachers have decided to use computer contacts. We are hoping to
contact children who are 10 to 15 years old. The students will need information on the
following issues.

Please describe a typical day in the life of a kid of your age. The school, the length of
the school day, lessons, homework, subjects, clubs, sports, hobbies, and other interests.
Attitudes toward reading books, watching TV, computer games. The nearest surroundings;
short descriptions of cities, towns, or countrysides; and information about interesting or
historical places that might interest tourists.

These questions can be answered individually or in a group, where the pupils can choose
between items. If we get any response, our pupils will use the information in many
different ways, for example, making graphs, writing essays, and giving lectures. Our
pupils will then send a 'Thank you' letter and give similar information about Iceland.

Afterwards, it's possible that our pupils will want to continue corresponding through the
computer or otherwise.

I sincerely hope that someone will be able to take part in this project.

Valgeir Gestsson
Library, computer, and science teacher
Grandaskola, Reykjavik, Iceland.
```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Keypal activities are also perfect conduits for language study. The following, for example, is the introductory message (with translation) from a group of students who live near Paris and wish to learn about classes in other parts of the world where students study computer use.

```
Date: Tue, 15 Dec 1992 08:41:17 +0100
From: "R.Rolland" <UROL0010@FRORS12.bitnet>
Subject: Presentation

BONJOUR

Nous sommes des eleves de quatrieme technologique et avons entre treize et seize ans.
Romain Rolland est un college mixte, situe a CLICHY SOUS BOIS, dans la banlieue de PARIS.
Les eleves d'une classe technologique doivent travailler sur des projets en faisant
beaucoup de technologie et d'informatique. Nous voulons communiquer avec vous, pour mieux
vous connaitre.

De quelle classe etes vous ?
Ou se situe votre college ?
Faites vous de la technologie ?
Travaillez vous le samedi matin, le mercredi ?
Quels sont vos loisirs preferes ?

Nous voulons aussi communiquer avec vous pour que vous puissiez nous aider dans nos
recherches sur le theme du jeu.

HELLO

We are a group of pupils, aged from 13 to 16, in fourth technologique. Romain Rolland is a
mixed school located in CLICHY SOUS BOIS, in the suburbs of PARIS. In a technology class,
pupils must develop projects related to technology and computing. We want to communicate
with you, in order to know you better.

- What is your class ?
- Where is your school located ?
- Do you take technology courses ?
- What are your favorite activities ?

We also want to communicate with you to get information on the subject of games.
```

Students at Burleson High School in Texas communicated with students from South Africa, Norway, Finland, Denmark, Peru, Russia, Estonia, Chile, Mexico, England, Iceland, Germany, and Canada, exchanging information about their experiences living in the 14 different countries as part of a project called "The World at Our Fingertips." Their teacher, Brenda Yowell, arranged for these exchanges by posting a message to the KIDLINK discussion list. Diane Eisner of Lexington, Massachusetts, similarly arranged for her 85 seventh-grade students to discuss the books *I Am Rosemarie* and *The Cay* with electronic "literature partners" via electronic mail and synchronous discussions on IRC (Internet Relay Chat).

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"Town Twinning" projects, in which students from towns with the same names in different countries communicate with each other, can also be conducted according to keypal activity structures. For example, students from Mano Talaiver's classes in Richmond, Virginia, communicated with Mike Burleigh's students from Richmond-on-Thames in the United Kingdom, first answering the four questions that all participants on the KIDPROJ discussion list must address:

```
1.  Who am I?
2.  What do I want to be when I grow up?
3.  How do I want the world to be better when I grow up?
4.  What can I do now to make this happen?
```

Melanie Golding, an English teacher from a high school in northern New York, structured a six-week keypal project in which her 14–17-year-old students exchanged information about their families, town histories, schools, local geography and history, local and federal governments, and holiday customs. The educational goals for keypal projects in general are well stated in this excerpt from the message that she posted to announce the availability of this "Getting to Know You" project:

```
I hope that my students are able to connect with students from France, Germany or Israel
because they have studied these countries this year in their history classes. My intention
is to foster communication, technology, and cultural awareness. This can happen by merely
letting the children talk. We can start this process by having the children write
individually to one another.
```

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Keypal projects often combine use of newer and more traditional media. The following is a well-structured call for participation posted by teachers and students from a suburban area in Pennsylvania.

Subject: Partner Class in Reading, PA

As an ongoing year-long project funded through a local educational grant, the sixth grade at Twin Valley Middle School, Elverson, Pennsylvania, USA, would like to exchange cultural information with educators and their classes in Europe (or other foreign countries) via letters and electronic mail for the 1992-93 school year. This project, coordinated by sixth grade teachers Nancy Newpher and Felice Marrongelle, will involve all disciplines of sixth grade students.

To further enrich this project, the sixth-grade team felt the exchange of cultural items and gifts would be highly motivational to the students. The sixth-grade social studies curriculum includes the study of other cultures. We hope to enhance our students' studies by enabling them to have a direct link to the outside world and other cultures. This project will involve approximately one hundred sixth-grade students including students with special needs.

1. Twin Valley Middle School students, ages 11-13, will correspond with individual students, a small group of students, or an entire class/classes of students 11-15 years of age. Affirmative response should be received no later than October 15, 1992.

2. By October 31 a pen pal exchange using FrEdMail/regular mail should have been started and will continue throughout the 1992-93 school year. This correspondence should enable the students to share the following information:
   a. biographical/family, hobbies, sports, and other interests
   b. geographical and historical information about their region/country
   c. political information about their region/country
   d. social customs/foods, clothing, holidays, and so on
   e. religious information about their region/country
   f. educational information about their region/country
   g. literary
   h. environmental issues that affect their region/country
   i. other…

3. Another goal is to have Twin Valley students prepare and mail a box containing students' work, cultural items, photographs, videotapes, and other items characteristic of our region.

Twin Valley is located 45 miles northwest of Philadelphia, Pennsylvania, USA. Several years ago the community consisted of mostly farming areas with a large influence of Mennonite and Amish customs. Presently, industry and construction of individual homes have contributed to a change in social and cultural life and the wealth of the area. The cultural box is to be mailed by March 30. Twin Valley students would appreciate receiving similar items from students involved in the project, but it is not mandatory to participate.

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Some keypal projects ask students to use only electronic media, but are structured to include more traditional forms of communication. For example, in the following request for participation posted by a teacher in Virginia, an activity for new e-mail users incorporates the creation of a "letter of introduction."

```
.--------------.     .-----------------------------------------.
| INTRODUCING  |     | Moderator - Anne Pemberton              |
.--------------.     | CAMPUS 01:CLK005                        |
                     | Internet apembert@vdoe386.vak12ed.edu   |
                     .-----------------------------------------.

  An excellent first project for the new user. Students are paired and each student should
write a formal letter of introduction about the other to be sent to our friends abroad via
INTRODUCING@ajuvm.stjohns.edu

  We recommend that it should be about 30 lines long and that it should follow this
pattern:

    Paragraph One - a brief description of X
    Paragraph Two - the interests/opinions of X
    Paragraph Three - an amusing story about X (gentle fun perhaps?)
    Paragraph Four - the strengths/talents of X
```

Many keypal projects emphasize the importance of students learning about each others' cultures through direct (albeit asynchronous) contact with other students. In the following well-designed project, written by two teachers in Ohio, students use multiple references and higher order thinking skills to research and clarify information about each other's everyday lives.

THE REYNOLDSBURG GEOGRAPHY PROJECT

The Geography Project is designed to link students from different countries for the purpose of studying foreign cultures as well as research techniques. The major goals of the project are to:

A) hone students skills in researching scientific and social information and map interpretation

B) encourage students to communicate with others in other countries

C) help students develop an understanding of the differences between scientific fact, presumption, and errors based on misinformation resulting from stereotypes and prejudice

The project will link individual students, or small groups of students, via electronic mail. After exchanging a few letters, the students will then be instructed to learn as much as possible about the other students' countries through research. They may look at maps, books, magazines, and any computer-generated data they can find. One example of a resource on our side is *The World Book of Facts*, which is compiled by the American Central Intelligence Agency. It has facts about climate, population, major businesses, and major economic influences in most major cities and countries. The book is available on our local Information System. Students will use that and other sources to learn as much as possible about the other countries.

After the research is complete, each student must write "A Day in the Life of the Other Student." The paper should include each student's thoughts on what the other student's life is like, what schools are like, what the students do for fun, what kind of work/ responsibilities they have outside of school, what family life is like, what most students' attitudes are about the future.

These questions should be answered to the best ability of the student who has researched the other country. So If John Smith, of Reynoldsburg, is working with a student in Japan, he would communicate with a student from there, and then begin research using as many sources as are available to him. He will then write a paper entitled "A Day in the Life of _____." The student in Japan will do the same thing, studying the American student.

When the papers are finished, they are exchanged. When students receive the papers about their own lives, they will critique them. Obviously, they will discover mistakes. John Smith may not understand how Japanese life has become modernized; while the Japanese student may have false assumptions about what Americans do with their leisure time.

In the critique, each student should point out which observations are correct and which are wrong. Then each will write about what their day-to-day life is really like.

In this way, the students will use research tools to learn about real people in other cultures and have the opportunity to separate myth from fact - stereotypical prejudice from actual social behavior.

Unfortunately, student-to-student keypal exchanges often involve more managerial work than many teachers have time to contribute. Group-to-group exchanges (called *global classrooms*, and presented in the next section), especially those with a particular study emphasis, can evolve into fascinating collaborative explorations without overwhelming activity facilitators with the transfer and processing of multiple electronic mail messages sent to and from a single account.

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Global Classrooms

With this activity structure, two or more classrooms (located anywhere in the world, of course) can study a common topic together, sharing what they are learning about that topic during a previously specified time period. Currently, this appears to be the most popular type of educational telecomputing project.

For example, two American Literature classes in two different schools studied *The Glass Menagerie* together in 1991, discussing the play by e-mail. In another example, students from Barrow, Alaska, posted the following message in mid-November 1994, initiating a simple and fascinating global classroom project:

```
Date: Thu, 17 Nov 1994 15:45:57 GMT
From: Maryann Holmquist <mholmquist@arctic.nsbsd.k12.ak.us>
Subject: sunset
   Greetings from Barrow, Alaska, USA. It is pretty cold in the Arctic. We live in a
desert but tomorrow (Nov. 18) when the sun dips below the horizon like a seal we will not
see it again for 65 days. Sunrise is at 12:37 p.m. and it sets at 1:46 p.m. for a total of
1 hour, 9 minutes of day. The horizon will be a fiery orange. We will continue to ride on
snowmobiles and go sliding and when we get cold we'll go inside.
   Write to us and tell us something about the sun from where you live on this planet.
How much sunlight do you get? Do you have a favorite sunset you remember?
   From the Kids at Ipalook School
```

Students from Caribou, Maine, organized a project through which several groups could explore similar cultural roots with this message:

```
Date - Mon, 12 Sep 1994 15:27:28 -0400 (EDT)
From - Paula Robertson <paularob@saturn.caps.maine.edu>
We are grade 8 students from Caribou, Maine, who have Acadian roots (French) and we want
to compare our cultures and lifestyles with the Louisiana Cajuns. Is there anyone out
there who may know of schools or individuals in the Lafayette, Breaux Bridge, Broussard
and Iberia regions of Louisiana who have electronic mail capabilities with access to
Internet? We are excited about this project and want to start as soon as
possible. Please spread the word. :-)
Paula Robertson
Ruth Dionne
```

Eight-year-old students from New Zealand studied *villages* (including the Global Village) by asking other students from anywhere in the world to answer the following questions:

```
1. What do you think a village is?
2. Could your area be called a village? If not, how do you describe your area?
3. List some features of your village. (We're looking for similarities and differences
here)
4. Do you know of any other kinds of villages?
5. Do you think our class could be part of The Global Village?
Here's a question in case none of the above questions appeal!
6. What do you think the Global Village means?
```


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These students, with the help of their teacher, Sue Graham, offered their responses to the questions in this way:

```
We think a village is a place where families live. It is a group of houses and shops close
together.

We live in the city of Dunedin, New Zealand, which is halfway between the Equator and the
South Pole and we're the first country in the world to see the sunrise each day. Our
shopping centre is called the Roslyn Village, which is on the top of the hill surrounded
by very busy roads. We have lots of shops very close together. There are a number of old
wooden villas, some big brick houses, some narrow steep streets, and not many open spaces.

The Maoris, who lived in NZ before the Europeans arrived, used to live in a fortified
village called a pa. This was usually on the top of hill, with a fence to keep out enemies
and a good view to see other tribes coming to attack.

We're not sure what The Global Village is, but we know that it has something to do with
people living in our world.

What is your village like? Is your 'village' like ours or is it different?
```

Students in Strongsville, Ohio, invited others from around the world to join them in their study of environmental issues related to the observance of Earth Day with the following call for participation.

```
Join high school students around the globe in a shared commemoration of Earth Day 1993 by
reading and responding to Robert Frost and Maya Angelou's Inaugural Day poems. Students
from Strongsville, Ohio, USA, will compile and re-post your writings, dreams, and
reflections as a collective vision for a cleaner, healthier, and life-enhancing planet.
Ideas you might want to consider:

   - Do you share either poet's feelings about the Earth, her peoples, our shared destiny?
   - Which poem speaks to you, and the '90s, most clearly? Why?
   - Are Frost and Angelou writing about the same issues?
   - How has the state of the planet changed since John Kennedy's day?
   - How will Bill Clinton live up to the challenge voiced in each of the poems?
   - What sort of response is implicit in each poem?

Please send your paragraph-length responses and any comments or suggestions by e-mail only
to: David Lackey, Strongsville H.S., at ar683@cleveland.freenet.edu. This project is
sponsored by Project Common Ground, a student ecology network supported by the Ohio EPA
and The Ohio University Institute for Democracy in Education.
```

Global Classroom projects often address current issues and problems for which there are, as yet, no solutions. Bill Parks, a UNICEF volunteer from the United Kingdom, for example, led weekly discussions on such issues of direct relevance to children via the KIDPROJ e-mail list (listserv). Here is a sample of children's responses to his question concerning safety.

```
Keep Us Safe

No, kids are not safe. Kids should not be getting in people's cars if you do not know the
person. Your parents can keep you safe. And your uncle and your aunt and your sister and
your brother can keep you safe. Kids can be safe in school. Do not let anybody in the
house if my mom is not home. If a person steals something, I will call the police. We can
get all of the bad talking out of the world. But you cannot be safe anywhere. And wars
cannot save you. Dedrick will try to help some kids when he goes to work. He will try to
give medicine for the children.

by Felicia, Timeka, and Dedrick

---------------------------------------------------------------------
There are all kinds of war, like World War I and World War II and the Vietnam War. There
is a Vietnam Memorial. And my Poppop was in it. If children were in the middle of it, they
would be horrified.

by Phillip

---------------------------------------------------------------------
We are not safe because of gangs, drugs, abuse, fires, and crime. And there has not been
one day that I have not heard a fire engine or a police car. Safety is when you have
shelter and protection. We can get a metal detector so they can't bring weapons to school.

by Alexis

---------------------------------------------------------------------
Sometimes you are safe. It is scary to get hurt. You have to be careful. Watch out for
each other. In the future lots more people are going to get killed. There is too much
violence in this world.

by Darius

---------------------------------------------------------------------
We can stop people from fighting each other and try to get along.

by Troy

---------------------------------------------------------------------
```

In a large-scale effort to involve many classes in HIV/AIDS awareness, Rhea Smith from the Jenkins Middle School in Palatka, Florida, organized a month-long series of activities designed so that her students "help[ed] teachers, parents, and children to understand the dangers of the HIV/AIDS virus and formulate a plan to remain HIV/AIDS negative." The "electronic schedule of events" looked like this:

```
Schedule of Events:

Feb. 1-15       Registration
March 1-5       What is the HIV/AIDS virus?
March 8-12      AIDS and Education
March 15-19     AIDS Testing
March 22-26     Your student oath to remain HIV/AIDS negative and The Wall of AIDS messages
```


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Suggestions for discussion and action for each week of activities were included in the plan. For example,

```
WEEK FOUR EVENTS
MARCH 22-26:

On April 7 Jenkins Middle School students will be having an AIDS Awareness Day along with
the Opening Ceremonies of the new AIDS Voice Mail system. We will have Eyewitness News and
other major TV news and newspapers here.

We would like to have a wall of AIDS messages from students, teachers, and professionals.
The theme is "I am HIV negative and here are the ways I will remain HIV negative for the
rest of my life." Please have your students construct a message on this theme or an
important AIDS message they would like to share with everyone. These messages will be
decoratively displayed on a huge wall for viewing by media, students, parents, community
members, and visiting guests.

<rsmith@eagles.cerf.fred.org> ---------------- 29.30.34.4N, 81.38.51.5W
```

Students and teachers participating in this month of thematically related activities shared their discussions on FrEdMail bulletin boards and through e-mail.

Please note that global classroom projects are often more topically focused than keypal projects, and involve groups of students, rather than individual students, communicating with each other. In one project, for example, technology specialist Enola Boyd from Amarillo, Texas, organized a collaborative exploration of local nuclear facilities among a half-dozen upper elementary classes. In Ms. Boyd's words, participating students "studied the functions and impacts of nuclear facilities on their surrounding communities."

While some global classroom projects are structurally simple and short-lived, others are quite complex and can involve students for one or more school semesters. The "Desert and Desertification" project, coordinated by Hannah Sivan, David Lloyd, and Oded Bar from Sde-Boker, Israel, was a year-long, four-stage interdisciplinary project for students from around the world who were interested in studying about deserts in the past, present, and future. It included a rich array of activities, involving participants in discussion, online and offline data collection and organization, sound and image collection and transmission, film viewing, subject matter expert interviews, literary analysis, desert field trips, simulations, roleplays, and environmental forecasting.

"The S.S. Central America—A Shipwreck to Remember," a similarly rich and varied four-stage, interdisciplinary, year-long project with historical and meteorological emphases, is being coordinated by Jamie Wilkerson of Rosewood Elementary School in Rock Hill, South Carolina. In this project, students electronically explore the voyage and sinking of a 272-foot wooden steamship, along with the weather conditions that led to its demise, in electronic consultation with members of the Columbus-America Discovery Group, the

team of scientists and historians who are currently working to salvage the S.S. Central America's history and treasures.

Electronic Appearances

E-mail, newsgroups, and electronic bulletin boards can also host a special guest, with whom students can correspond either asynchronously, as is most commonly done, or in real time (with the guest and the students typing back and forth to each other synchronously, using a chat feature that is available on many Internet accounts).

One such "electronic event" was held in Academy One on the National Public Telecomputing Network's (NPTN) Cleveland Freenet in the fall of 1993. Nobel Laureate Paul Berg had a "virtual visit" with high school students from many different states, provinces, and countries. The announcement of the plan for participation in the electronic meeting follows.

```
DETAILS ON HOW TO PARTICIPATE IN THE VIRTUAL VISIT

General Description of the event:
---------------------------------

When: Tuesday, September 21, 1993

Dr. Paul Berg, one of the principal pioneers in 'gene splicing,' will be meeting with high
school students in the Los Angeles area to answer questions they might have on the subject
of gene splicing and the structure and function of DNA.

Academy One will be extending this meeting to the online community. The meeting will begin
at 0900 PDST. A summary of the progress of the meeting will be posted to a special
listserve (a-lspecial@nptn.org) approximately every 15 minutes. Schools can subscribe to
this listserve following the directions below and read the updates as they are released or
when it is convenient to them.

At 1000 PDST an IRC chat on the YFN will begin on channel *Berg. Schools may come together
in this electronic 'cafe' to talk with each other about genetics and to 'electronically'
join the meeting in progress in California.

Students from the California audience will be able to view the IRC chat via an overhead-
projection system. This will make the 'local meeting' an international meeting via the
online environment and Dr. Berg will be able to answer questions from schools in other
areas during this IRC chat.
```

Dr. Berg supplied a paper that he had written on gene splicing and a *.gif* encoded picture of himself via the Internet that students could use to help them prepare questions for the electronic meeting. A series of such "electronic events" is held regularly in Academy One, coordinated by Linda Delzeit (linda@nptn.org). One event connects students with authors of children's books, such as Sheri Cooper Sinykin, who wrote *The Buddy Trap*, *Slate Blues*, and *Next Thing to Strangers*, and who answered students' previously submitted questions in a public conferencing area during the month of May in 1994. Authors also share "background information, a little about what they have

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written, and insights on the writing process" while participating in this "Authors Online" project, according to Ms. Delzeit.

A historically focused electronic appearance activity, hosted by Academy One, took place recently. The "50th Anniversary of D-Day" project helped students to explore World War II by asking, electronically, for participants' memories. The project was summarized online as follows:

```
The Dept. of Defense has a World War II Commemorative Community Program surrounding the
50th anniversary events. Fact Sheets from the DOD are posted on various facets of WW II. A
special panel of WW II survivors are available for students to ask questions. Some
memories have been posted from these survivors that make interesting reading and research.
As part of the Commemorative Community Program you can sign up your community, school, and
community computer system as Commemorative Communities. Each community that registers will
receive a Commemorative Flag authorized to be flown on poles just below the State Flag,
and each member of the committee will receive a special lapel pin.
```

Also, NPTN now hosts a multinational "Career Panel," which calls upon a large number of adults who work in many different kinds of jobs to share details of their responsibilities, employers, work schedules, tools, and educational/professional preparation with interested students.

The fact that the Internet can connect subject matter experts directly with students, so that they can engage in inquiry-based dialogue either synchronously or asynchronously, is an exciting, but as yet underutilized, aspect of the network. Electronic appearance projects usually allow students to communicate with locally, nationally, or internationally known people for relatively short periods of time. When exchanges with subject matter experts become more extended, and an "electronic apprenticeship" forms, the activity structure can be called *electronic mentoring*.

Electronic Mentoring

Internet-connected subject matter specialists from universities, business, government, or other schools can serve as electronic mentors to students wanting to explore specific topics of study in an interactive format. The Cleveland Freenet's Academy One project hosts an activity called "Spotlight on People." This provides an opportunity for students to communicate with leaders, inventors, authors, and other professionals who are accomplished in their fields. In another mentoring project, undergraduate students at the Oranim Teacher's College in Israel served as mentors on the subject of prejudice. For two academic semesters the college group communicated with high school students in England, Australia, the United States, Ireland, and Israel.

A service called the "Electronic Emissary," sponsored by the Texas Center for Educational Technology and the University of Texas at Austin, helps to match volunteer subject matter experts from all over the world with teachers and their

classes. The service then helps the newly formed teams structure a mentoring project that focuses on the subject matter expert's field of expertise. Students and teachers then communicate via e-mail with the subject matter experts. After the exchange is over, they share what they learn together by creating file archive documents for other Internet-connected students and teachers to use.

Students can also serve as mentors to other students. Kurt Grosshans' advanced placement chemistry students in Virginia are providing answers to science questions that students from all over the country pose as part of a service called "Ask Mr. Science."

```
Once again it is time to ASK MR. SCIENCE. This is the third year of the project, and I
would like to thank all of you who have participated and to encourage those who have yet
to write to do so.

  Project Description.
  Have your students post any science based question to:

       apscichs@radford.vakl2ed.edu

  There is no limit to the possible topics they can draw from.
  Astronomy, biology, chemistry, physics, earth science, ANY
  QUESTION, ANY TOPIC.

The question(s) are then assigned to my AP chemistry students, and they will research and
formulate a reply within 48 hours. Answers will be returned to the sending address. I only
ask that you limit the number of questions per posting to five. However, you may post to
Mr. Science as many times as you wish.
```

Philip Sandberg's undergraduate geology students at the University of Illinois (Urbana-Champaign) served as mentors to precollege teachers and students as part of their requirements for their "History of Life" course. Professor Sandberg described the intent of the project as follows:

```
I am looking for classroom teachers (with access to a network connection for their class)
who are interested in participating in an electronically mediated science education
project with me and my students in Geology 143 (The History of Life) this semester.
Interested students in my geology class are receiving training in e-mail, news groups and
network (Internet) information search and retrieval. I want them to develop skill in
electronic communication by linking electronically with elementary and middle school
classroom teachers and students and serving as information brokers in support of
instructional modules, in those classrooms, on the history of life (dinosaurs, mammal
evolution, extinctions, etc.) and history of the earth (origin of the Appalachians,
opening of the Atlantic, etc.), and the functioning of the earth (plate tectonics, etc.).

In order to accomplish this, we need participating classrooms with students and teachers
interested in advancing their understanding of the earth by collaborating with me and my
students. Because a very large number of my students (over 90) originally indicated their
interest in participating, we need quite a few classrooms. I anticipate that teams of 3-5
students will work with each participating classroom, searching out answers to the
classroom questions, either over the network, or through the library resources here on
campus. That information would then be transmitted to the classroom, along with its
source, including how to navigate to it, if it came from over the network.
```


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Using another activity structure that has recently emerged, students' contacts with subject matter experts are brief; only as long as is necessary to have their questions answered.

Question-and-Answer Services

In the fall of 1994, the U.S. Geological Survey made an exciting new service available to Internet users. "Ask-A-Geologist," coordinated by Rex Sanders of the USGS Branch of Pacific Marine Geology, allows K-12 students to submit questions that are answered by professional geologists. The service was described, in part, like this:

```
Date: Wed, 26 Oct 1994 23:30:57 GMT

Ask-A-Geologist - US Geological Survey offers new Internet service

Have you ever wondered about why California has so many earthquakes, and New York does
not? Why is there so much oil in Texas, but not in Wisconsin? What are the deepest canyons
in the United States? (The answer might surprise you!) While the answers to many of these
questions might be as close as an encyclopedia, some questions are difficult to answer
without checking many sources.

Beginning Monday, October 4, 1994, the USGS will offer a new, experimental Internet
service - Ask-A-Geologist. General questions on earth sciences may be sent by electronic
mail to the Internet address:

      ask-a-geologist@octopus.wr.usgs.gov

All electronic mail to Ask-A-Geologist will be routed to the geologist of the day. The
geologist will reply to your question within a day or two, or provide referrals to better
sources of information. Please include an Internet-accessible return address in the body
of your message.
```

Kay Corcoran, a middle school teacher in Mendocino, California, helped her students to form questions for ancient historians who participate in a number of scholarly electronic mail discussion lists to answer. The basis for this project is rich and educationally sound. As Ms. Corcoran stated in her project summary,

```
To enliven and engage the middle school learner, project-based units based on guided
research are a popular feature in the History/Social Science curriculum. Typical research
projects utilize the resources of school and community libraries, and students need to
learn to read information closely and thoughtfully. With the availability of
telecommunication resources for research on chosen topics, they soon discover that
"historical fact" is open to interpretation, contradiction and occasional controversy.

As a culmination activity to their research project presentations, those students who have
been "critical readers," who have recorded inconsistencies, who have exhausted their
resources and have unanswered questions may utilize listservs to provide clarification.

A variety of history listservs abound, and the discussions cover a wide range of topics.
Not only will 6th and 7th graders see that ancient history is alive and well, but that
"historical fact" is open to interpretation based on evidence. History listservs provide
an excellent opportunity for middle school students to observe the give and take of
inquiry and to dialogue with the experts.
```


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Conversations with others online can also take on more fanciful characterizations, as in the case of *impersonation* activity structures.

Impersonations

Impersonation projects are those in which any (or all) of the participants communicate with each other "in character." At the University of Virginia, for example, educational history professor Jennings Waggoner "became" Thomas Jefferson via electronic mail for several local elementary classes studying Virginia history. His work is now carried on for a much larger number of precollege students who use Virginia's PEN (Public Education Network) by a team of docents at Monticello, Mr. Jefferson's home. Students who use the Elementary Book Conference on VaPEN can communicate with characters from children's literature, such as Winnie the Pooh, Willie Wonka, and Ramona Quimby. These exchanges are coordinated and studied by Jeradi Hochella, James Madison University; and Jan Stuhlmann, Louisiana State University.

In "Characters Online" project, an Internet-based project sponsored by the Nebraska State Department of Education and the University of Nebraska at Omaha, undergraduate preservice teachers used e-mail to impersonate the main characters from books that students in elementary classes in eastern Nebraska were reading with their teachers.

Students can also write messages or public postings in character for other students to read. In the California Missions project, coordinated by Nancy Sutherland from the FrEdMail network, 21 fourth-grade classes in California (one for each of the 21 California missions) wrote and shared fictitious journal entries that described the lives and aspirations of people who participated in the missions in the early and middle nineteenth century. Ray Medeiros, from Dighton Middle School in Somerset, Massachusetts, organized a collaborative exploration of Colonial America by posting an article on a FrEdMail bulletin board that began with the following paragraphs.

```
Have your students ever read the heartwarming letters written by post-Revolutionary War
settlers Patricia and Peter Carpenter of Pittsburgh, Pennsylvania? Or those of their
children - David, a fur merchant, and Sara, who married a Susquehannock Indian? Probably
not, because my students at Dighton Middle School wrote them as part of an American
history project we would like to share online with third through tenth graders around the
country.

Registration information, a project overview, and materials are in the attached file.
```

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In the context of his project, "Colonial Computing," students at different sites formed fictitious Colonial families and exchanged letters that contained historically accurate details of Colonial American life.

Following the popular example set by Kurt Grosshans' advanced placement chemistry students in Virginia with their "Ask Mr. Science" project, participants in the Geometry Forum at Swarthmore College offer the services of "Ask Dr. Math" in the following way:

```
*********************************************************
*                      Ask Dr. Math                     *
*                                                       *
*                Have a math question?                  *
*       No problem's too big or too small               *
*    Want to talk to someone who loves math?            *
*          Let's do some math together!                 *
*                                                       *
*                      Write to:                        *
*            dr.math@forum.swarthmore.edu               *
*********************************************************

If you are a student in elementary, middle, or high
school, write to us! We can't wait to get some really
good problems from you. All of the Ask Dr. Math
letters are answered by members of "The Swat Team,"
math students and professors here at Swarthmore
College. Ask Dr. Math is a project of the GEOMETRY
FORUM, an NSF-funded program housed at Swarthmore
College in Swarthmore, Pennsylvania, USA.
```

A favorite telecomputing impersonation project has been conducted on the FrEdMail network in November and December since 1984. The project's primary character is one familiar to many students in the world.

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```
Project Name: The SANTA LETTERS
(c) October 1, 1993
By Dennis Cowick     FrEdMail Foundation
A favorite annual FrEdMail project since 1984

Date:          November 12, 1993, to December 10, 1993

Purpose:       Improve writing skills in primary and upper grade students, and produce
many student-authored papers for reading.

Subjects:      Language arts

Grade level:   Students in grades K, 1, or 2 write letters to "Santa." Students in grades
7-12 reply as "Santa."

Summary:       This letter exchange, pairing classes of elementary students with
junior/senior high students is one of the oldest and most successful telecomputing
projects.

               Best of all, it is simple:
                    1) Primary students write letters to Santa using a word processor.
                    2) Secondary students write back, pretending to be Santa.
                    3) The letters are exchanged as electronic mail.

Number of participants: Unlimited

PROJECT COORDINATOR:
    Dennis Cowick
    Mark Twain Junior-Senior High School
    San Diego Unified School District
    San Diego, California
```

Clearly, this is a rich and motivating way for students to use telecomputing tools to help them to explore many curriculum-related topics in dynamic, interactive contexts.

Information Collections

Some of the most successful educational telecomputing activities involve students collecting, compiling, and comparing different genres of interesting information.

Information Exchanges

There are many examples of thematically related information exchange that have been employed as popular telecomputing activities. Students and their teachers from all around the globe have collected, shared, and discussed, for example:

- folk games
- slang words
- jokes

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- proverbs
- folktales
- local agricultural information
- biome data
- water use information
- recycling practices
- personal health information
- idioms
- hometown tourist information
- student-written book reviews
- summer and winter solstice information
- children's voices (as sound files)
- teenagers' fashion preferences
- favorite quotes
- international eating habits
- local weather conditions around the world
- children's hour-by-hour schedules of activities on a common day
- recipes
- wild bird observations
- family life customs and perspectives
- insect identifications
- immigration/emigration experiences
- international holiday customs
- Internet signature files
- videoletters
- schoolground ecosystems
- school safety rules

to name just a few.

This type of activity can involve many classes without becoming an overwhelming management task for teachers. These projects are particularly powerful applications of telecomputing tools because children become both the

creators and consumers of the information they are sharing. Activities like these typically begin with a call for participation that is posted by a classroom teacher.

```
Subject: International Folk Games Project

-->-------------------------------------------------------------<--

ORILLAS, a multilingual network for teachers and students interested in cross-cultural
learning, announces a new group project:

INTERNATIONAL FOLK GAMES COLLECTION

_____ How to play the game _____
_____ Group report on playing game _____
_____ Interviews with peers or adults _____
_____ Illustrations _____
_____ Memories _____

All grade levels and languages welcome! We ll share the games and student writing with all
participating classes. We hope you and your students will join us!

-->-------------------------------------------------------------<--

"Cuando la escuela presenta el folklore a los ninos esta  dandoles el mensaje de que
reconoce la riqueza cultural presente en el hogar. Esta validacion de la familia y la
comunidad es de maxima importancia..." [Alma Flor Ada, prize-winning author of Spanish-
language children s literature]

"Studying folklore in the schools gives students an appreciation of the richness of their
cultural heritage. This validation of the family and community is of maximum
importance..."

Kristin Brown, Enid Figueroa & Dennis Sayers
ORILLAS Codirectors
(KBROWN@SDCOE.CERF.FRED.ORG)
```

Plans for another information exchange project were posted by an American teacher working in Japan.

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WHAT S SO FUNNY?

Date: Thu, 23 Apr 92 23:27:51 JST
From: Hillel Weintraub <hillelw@aegis.or.jp>
Subject: New Project-Call for Participants

I am particularly interested in getting one class involved with a project that I think they can enjoy and learn from in an expanded way through telecommunication. It s a project I ve been thinking about for some time, and I feel it is ideally suited for getting learners to think about intra- and intercultural communication.

I call the project, "What s So Funny?" It basically will involve having learners (in grades 10/11, ages 14-16) look at humor, first from an individual perspective, then from a cultural perspective, and finally from an intercultural perspective, though of course this will not be a perfectly linear approach. That is, naturally the students will be moving back and forth among these three modes (personal, intracultural, and intercultural).

I see this project as dealing with many kinds of materials, most of which cannot be sent online, but the conversations ABOUT the materials certainly can be shared online. For example, while verbal or textual humor can be sent online, drawings and films will have to be sent by regular mail.

SCHEDULE (tentative and general)

PART I: APRIL-JUNE 1992
Within each class: Students begin to search for things that they find personally humorous and discuss what humor is: "what s so funny?" Begin to look for cultural features of humor; that is, what students THINK is funny only or especially to their own national group. Some research can be done by the students into subcultural humor, as most of our countries have a wide range of groups that could be interviewed.

Between classes through the network: These first months will just be to introduce ourselves and our schools and develop reasonable size groups of 2 to 3 people in each setting.

PART II: JULY-AUGUST 1992
A packet of materials will be sent from each participating school to each of the other schools that will be used to start off the communication within and between the classes when they begin in September. This packet will contain materials that are particularly funny (and unfunny!) to the members of that group and can include text, cartoons, video, or whatever.

PART III: SEPTEMBER-NOVEMBER 1992
Students (and teachers) will be getting more comfortable with telecommunications and will begin to have a sending and receiving rhythm that should lessen crossed letters and long waits and hopefully allow us to have some sustained conversations. The materials that each school will have waiting for them in September should provide a lot of interesting discussions within each class and between the groups. I expect that there will be a lot of questions about various materials and explanations. I think that humor is something that we take so much for granted that when we begin to look at it and reflect on our feelings and try to express them to others, there will be a lot of confusion and need for clarification. (This is a quality that I think should contribute to a good telecommunication project.)

During the last months, I would like to encourage each class to create something to send to the other schools: this could be an original or traditional comic play, a series of interviews in the community, or some original drawings or jokes. The purpose of these would be to deepen that group s understanding of humor in some way and to build on what they have learned during the preceding 4-5 months.

PART IV: DECEMBER 1992
The materials prepared by each class would be sent to each other class.

154

```
PART V: JANUARY-MARCH 1993
The materials received from the other schools would be the basis for discussion within the
class and among the classes during the first weeks of January. I'm not sure of the best
way to close this project, nor do I see any need to decide about that in advance; it could
be a matter of discussion among each class and all the classes as to what would be the
most valuable way to close it.

Some possibilities: to try to create some sort of multimedia record, such as a videodisk,
or a video, or a collection of textual materials, or some kind of hypertext/multimedia
collection; but this would be a matter of time and interest. It also could be done in a
continuation of the project in the following year by some of the same students.
```

"Internet angel" Patti Weeg posted a call for a clever information exchange project with the following message:

```
From: "Patricia A. Weeg" <pweeg@source.asset.com>
Subject: *Multi-Cultural Calendar: 'Valentine' names
                ************************
                    Loving Names
                ************************
The Salisbury KIDCLUB kids searched for names of places that
capture the 'Valentine' spirit. Please add any other names
of cities, towns, mountains, etc. We know there must be
similar names in other countries but we just can't recognize
them... You'll translate them for us?
Many thanks!
-------------------------------------------------------------
Here's their list:
Darling Range Mts., Australia
Darlington, England
Darlington, South Carolina
Friend, Nebraska
Friendship, New York
Heart's Content, Newfoundland
Heart's Delight, Newfoundland
Honey Brooke, Pennsylvania
Honeygrove, Texas
Kissimmee, Florida
Love, Oklahoma
Lovejoy, Illinois
Loveland, Colorado
Loveland, Ohio
Lovelock, Nevada
Lovely, Kentucky
Loving, Texas
Lovington, Illinois
Valentine, Nebraska
Kristi, Kelli, Hickory, Maggie, Mickey, Karen, and Nada
-------------------------------------------------------------
```

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Sometimes students initiate information collection projects, too. These two young men, who are from two different countries, initiated an international project about flags by saying:

```
|- -=+ KIDPROJ FLAGS PROJECT '95 +=- -|

Dear Friends,

We (Andraz and I) would like to organize a project. A project about flags.
We are asking 'kids' to send us a 'drawing' of their flag and also a description... What
do the colors mean, and maybe some history...
Please DRAW your flag, because 'scanned' pictures are very big, and when we get a lot...
then the hard drive will get too full :)
Please sent your drawn flag with a description to:

KIDPROJ@vml.nodak.edu

[material deleted]

Andraz          -   pttsc3@public1.noprmd.mail.si
Robbert         -   parwanto@hacktic.nl
```

Sharing information that is intrinsically interesting to children on an international scale is an excellent way to engage students in cultural exchange.

Database Creation

Some information exchange projects involve not only collecting but also organizing information into databases that project participants and other students can use for study. Successful information exchange activities can "grow" into database creation activities.

One such project is a statewide collaborative exploration of Texas history project in which the documents that result from students' site-based research were added to an Internet-accessible Gopher. (For information on Gophers and related information location tools, see Chapter 1.)

==> PLEASE JOIN US! <==

...for a collaborative investigation of *Texas history* from 1830 to 1900,

...completed by students exploring and sharing information about **your community.**

By contributing to Armadillo, the Texas Studies Gopher, teachers and students from communities located all over the state will explore the history of the period from 1830 (before the Revolution) through statehood; the Civil War, Reconstruction and beyond; to the dawn of the twentieth century.

The focus of study will be on the location of each participating classroom's school building and the community surrounding it. Students will be asked to research and write about the local:

- agriculture
- climate
- culture and languages
- ecology (characteristic)
- economy
- entertainment
- famous people
- folklore
- landscape
- latitude, longitude, and elevation
- plants
- politics
- population characteristics
- sanitation
- transportation

during the 70-year period from 1830 through 1900, then post a document about their community's history on the Armadillo Gopher for other students in other communities to read. Each participating class will post one document summarizing their work on the Gopher.

Then, volunteer classrooms from anywhere in the state will become responsible for comparing, contrasting, and summarizing information about each of the community attributes listed above for each of the following Texas geographic regions:

- the Coastal Plain
- the Central Lowland
- the Central Hills
- the Edwards Plateau
- the High Plains
- the Basin and Range

Each of these documents also will be posted for everyone to use on the Armadillo Gopher.

By participating in this collaborative "electronic event," we hope that students will:

- become knowledgeable about their community's history during a very important time in the state of Texas

- discover the many relationships between historical conditions and local ecology

- use a variety of computer-mediated and noncomputer-mediated learning tools for research

- experience the study of history as a dynamic, collaborative, and exploratory endeavor

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.-=:> TIMELINE <:=-.

by October 29, 1993:	Register to participate in Phase 1 (see below)
November 1-December 10, 1993:	Participating students research topics listed above in relation to the communities in which their schools are located
by December 17, 1993:	Post completed documents on the Armadillo Gopher; directions on how to do this will be distributed electronically
by January 28, 1994:	Register to participate in Phase 2 (see below)
January 31-February 25, 1994:	Participating students read the documents posted on the Armadillo Gopher from a particular ecological region, comparing and contrasting the community attributes listed above among communities within the region
by March 4, 1994:	Post completed summary documents on the Armadillo Gopher

.-=:> REGISTRATION <:=-.

Would you and your students like to join this exciting project? If so, please send an electronic mail message to: Judi Harris (jbharris), stating:

1. your name, electronic mail address, surface mail address, and telephone number
2. the grade and class (subject, etc.) that you teach that you would like to involve in this project
3. your school's name and location in Texas
4. your local Educational Service Center number (along with the names of the Tenet Master Trainers in that ESC, if you know them)
5. in which of the two phases of the project (1 and/or 2) you would like your class to participate

-^*-*^*-*^*-*^*-*^*-*^*-*^*-*^*-*^*-*^*-*^*

Hope that we will "hear" from many classrooms across the state!

-^*-*^*-*^*-*^*-*^*-*^*-*^*-*^*-*^*-*^*-*^*

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Another database creation activity is the Seasons project, developed by Nancy Sutherland and Al Rogers.

```
Project Name: SEASONS - Spring (c) January 27, 1993
FrEdMail Foundation
This project was developed by Nancy Sutherland and Al Rogers of the FrEdMail Foundation.

Date: Feb. 15 - May 17

Purpose: To bring to students an awareness of the seasons, how they change and progress,
how they vary across the nation and around the world, and how to use the newspaper to
determine what those changes are in local and distant places.

To use a database to collect, organize, and query information to draw conclusions and
answer questions about the data.

Subjects: Science, social studies, math, and language arts

Grade Level: 3-8

Summary: Students will use the weather section of the local newspaper as well as their own
measurements to daily chart the temperature, rain fall, time of sunset and sunrise, and so
on to determine weather patterns and how the seasons change and are affected by such
things as elevation and latitude. Students will enter this information in a standardized
database template. Articles found in other parts of the paper also may be valuable in
providing information.

Students also will provide a brief SUMMARY of their observations of the seasonal changes.
Both the SUMMARY and the DATABASE will be shared with other participants and used to chart
weather and seasonal changes throughout the nation or world.

This project will be run once each semester - in the spring and fall.

Number of Participants: Approximately 30 classrooms.

Project Coordinator: Nancy Sutherland, FrEdMail Foundation, P.O. Box 243, Bonita, CA 91902
Email: seasons@bonita2.cerf.fred.org

Registration: The first attached file is the registration form. Please fill it out and e-
mail it to: SEASONS@sdcoe.cerf.fred.org.
```


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Students in Julie McMahan's Year 9 Computer Literacy classes created a database of important world events by compiling and reflecting upon answers to the following survey:

```
IMPORTANT EVENTS SURVEY

1) How old are you?

2) Are you a male or a female?

3) Where do you live?  (City, State, Country)

4) What is the name of your school?

5) What was the most important event that happened in your school during the past year?
(Please explain briefly why you feel this event was so important.)

6) What was the most important event that happened in your city or state during the past
year? (Please explain briefly why you feel this event was so important.)

7) What was the most important event that happened in your country during the past year?
(Please explain briefly why you feel this event was so important.)
```

As new information access and organization tools (such as the World Wide Web browser, *Netscape*) become more widely used in precollege classrooms, databases that students create across sites can be freely shared with the rest of the Internet community. Databases can also be created *for* students to access, using information that they supply. Venanzio Jelenic (venanzio@hookup.net), for example, proposed the "Jaunts" project, in which students from many different countries collect pictures of their hometown signs (i.e., "Welcome to Port Sydney, home to 500 nice people and one old grouch."), and send them, along with text describing the town and themselves, to Venanzio, who adds the information to a growing WWW page. (For more information on the World Wide Web, please see Chapter 2.)

Successful projects of this genre are well structured. They have a definite time schedule, requirements for participation are clearly stated, and teachers are asked (often by filling out a registration form) to commit to following these guidelines.

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Electronic Publishing

Another type of information collection and exchange can occur with electronic publishing of a common document, such as a newspaper, poem, or literary magazine. For example, David Egan, a social studies and history teacher at Cold Spring Harbor High School in Long Island, New York, coordinated an international student news magazine called *The Contemporary* through the I*EARN (International Education and Resource Network) project. Students do the majority of the work on the document. *The Contemporary* is published two times during each school year, with hope that "through peer education students can be made more aware of the problems our world faces and how young individuals can become more active participants in the broad movement to improve the condition of our planet."

A Vision, a similar I*EARN project at Cold Springs Harbor High School, is a "global literary magazine," that was originally coordinated by Maureen Ackerman, David Egan, Niko Clifford, and Brian Fox. The goals of producing *A Vision* are "to provide a worldwide forum where students can express their thoughts and feelings through poetry, prose, art, and photography as a means of advancing cultural sharing and understanding" and "to produce a magazine of this work so others may benefit from the sharing that has gone on." In a similar project for younger children, budding science fiction writers contributed to an anthology put together as an adjunct to an online Solar Sailing Simulation coordinated through the Cleveland Freenet's Academy One project during the fall of 1992.

The Global Schoolhouse Project (formerly the FrEdMail Foundation) takes a slightly different approach to electronic publishing. In their yearly *Newsday* project, participating teachers and students publish different newspapers locally, but take many of the stories for those local publications from a newswire shared electronically among all participating sites. The stories posted to this newswire are, of course, researched and written by students from all of the participating classes.

```
Project Name: NEWSDAY                          (c) FrEdMail Foundation
August 16, 1992

(Thanks to Greg Butler for the general information included here.)


Date:           November 6, 1992

Purpose:        To address and improve:
                * Academic skills - reading, writing, editing, revising, interviewing,
                literature appreciation, and understanding.
                * Social Skills - cooperative learning, leadership, listening, discussing,
                encouraging, and sharing.
                * TecHnical Skills - word processing, file management, keyboarding, and
                telecommunications: terminal software commands, uploading, and
                downloading.

Summary:        NEWSDAY is a multicurricular project in which students in each
                participating school produce a local newspaper based on the news
                dispatches submitted on the NEWSDAY newswire by cooperating student
                correspondents. Students become news gatherers and reporters, editors,
                layout and graphics artists, and publishers. Participation on a national
                and international scale leads to understanding of broad issues that
                transcend local concerns. This project can involve your students in weeks
                of cross-curricular activity.

                Schools may use a wide variety of methods to produce the papers, ranging
                from simple word processor cut-and-paste to full DTP packages.

                Participants will receive a newspaper produced by each of the other
                participants in the NEWSDAY project.

Grade Levels:   Upper elementary, junior high, and high school. Material coming off the
                newswire will appeal to all age levels. This is an excellent project to
                encourage profitable inter-grade participation.

Content Area:   Many content areas may be included in NEWSDAY. By deciding what kinds of
                articles and features to write, you can include a focus in almost any
                content area.
                Possible content areas:
                Writing         Reading                 Language
                Art             Social Studies          Science
                Environmental Science

Number of       Minimum of 10, Maximum of 30. If fewer than 10 schools register, NEWSDAY
participants:   will be canceled. When 30 registrations are received, we will open
                registration for a another NEWSDAY section.

Newsday Theme:  Cultural Diversity

Project         Nancy Sutherland, FrEdMail Foundation
Coordinator:    E-mail: newsday@bonita.cert.fred.org
```

In this way, students from participating schools in different cities, states, and countries experience an operationally realistic simulation of how many local newspapers are created and published.

Electronic publishing projects are becoming more popular on the Internet. Other notable examples include students who worked with Priscilla Franklin, of the Woolslair Elementary Gifted Center in Pittsburgh, Pennsylvania, to create

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an "ethnic cookbook" with recipes supplied from students all over the world. John Swang, director of the National Student Research Center at Mandeville Middle School in Louisiana (nsrcmms@aol.com), helps students to edit and publish both printed and electronic journals that feature the results of exemplary student research. And Gary Ritzenthaler (garyz@elm.circa.ufl.edu) who coordinates a "Global Student Newswire," which makes high school student-authored news stories and photographs available, via the Internet, to student journalists all over the world who are publishing news using a variety of media locally at their schools.

Telefieldtrips

Organizers for the Global SchoolNet Foundation encourage Internet-connected teachers and students to share observations and experiences made during local field trips with teachers and students from other cities, states, and countries. Erica Rogers (erogers@bonita.cerf.fred.org) maintains and distributes a monthly schedule of international field trip information posted by participating teachers. In this way, if an upcoming field trip will yield information pertinent to a particular class' curriculum, questions can be sent to the children scheduled to take the trip to answer while on the outing.

One unusual example of such an electronic field trip occurred in August 1994, when Jane Goodall took 60 children to visit the exotic animals on the Michael Jackson Ranch, teaching about their care and feeding, and sharing information about the issues associated with animal welfare. The students who visited the California ranch took other children's questions along with them, so that they could find answers and report them back to the remotely-located questioners. After the trip, the student visitors wrote and shared both the answers that they discovered and their general observations and impressions of the experience.

Electronic field trips can also be taken and shared without leaving the classroom, as students exchange information about the places in which they live. A fifth-grade class in Blacksburg, Virginia, for example, sent the following request for information on islands out to a number of different listserv groups, appending a list of specific questions for other classes to answer.

```
Date: Mon, 19 Oct 92 9:49:41 EDT
From: Beck Class <pfebeck@radford.vak12ed.EDU>
Subject: Need Help on Islands

We are students in Mrs. Beck's class at Price's Fork Elementary School in Blacksburg,
Virginia, USA. We are studying Islands of the World, and we want to find out what your
island is like.

Here are the islands we are studying:

Corsica          Japan          Tonga
Cuba             Ascension      Tasmania
Haiti            Galapagos      Iceland
Antarctica       Cyprus         Fiji
Marshall Isles   Coats          Revillagigedo

If you live on any of these islands now, or if you have visited one of them, please help
our fifth-grade class learn more about them. If you could answer some of these questions
for us, we will print them out and use them in our class.

Thank you very much. We are very honored to be talking with you.
```

A similar request for information from students who live near an ocean was sent by Donna Edington, a teacher from Danville, Illinois, who said, in part:

```
An eighth-grade class at North Ridge Middle School in Danville, Illinois, is seeking
collaboration from a class that lives on the coast. These eighth graders live on the great
plains where corn, soybeans, and livestock are mostly what they see. None of them have
been to the ocean. They have some questions about the ocean, living by the ocean, living
off the ocean, and so on that they would like answered.
```

Field trips (actually, expeditions) taken by experts are also shared on the Internet. The International Arctic Project, later incorporated into the excellent project series coordinated by Margaret Riel and Patti Weeg called "Passport to Knowledge," was a "multinational expedition across the Arctic Ocean by dog sled and canoe," and was originally described and updated by teachers involved with the World School for Adventure Learning through the KIDSNET listserv group. During one expedition undertaken by two explorers from the United Kingdom, participating classes received weekly detailed descriptions of the progress of the team, what they experienced, and the challenges that they faced. When the successful explorers returned to the United Kingdom, there was a wall of e-mail waiting for them from children all over the world who had, in a sense, been vicariously experiencing the expedition.

In another electronic expedition, a group of students from three states actually participated with oceanographers in a research expedition on the

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Mediterranean Sea. They sent back their daily logs via the Internet as part of Project Marco Polo.

```
PROJECT MARCO POLO

On July 24, 21 teachers and students, selected through the National Geographic Society's
Geography Teacher's Alliance will board the USNS Kane (a U.S. Navy oceanographic research
ship) in the Mediterranean. For three weeks, these teachers and students will be immersed
in ocean science and geography studies as they travel to Italy, Malta, and Tunisia.
Supported and taught by navy and civilian personnel, the Project Marco Polo explorers will
participate in activities that cover ship operations, geography, science, navy operations,
history, astronomy, nautical science, journal writing, and lesson writing. While the ship
is underway between countries, the teachers and students will conduct biological and
geological studies at deepwater stations. In Italy, Malta, and Tunisia, they will compare
and contrast these geographically close yet vastly different countries.

This year, Marco Polo participants will send a daily journal back to shore via the
Internet. Anyone who has a connection to Internet, either directly or through a gateway
(CompuServe, America OnLine, Applelink, FrEdMail) can receive these daily reports, and
send questions simply by subscribing to the MARCOPOLO@CERF.NET electronic mailing list.
(Note that MARCOPOLO is one word)

The daily reports will be written by the ninth-grade students from Maryland, Florida, and
Georgia who are aboard the USNS Kane.
```

In the spring of 1995, a team of archeologists and bicyclists was engaged in an expedition to Central America, studying the ancient Mayan civilization as part of "MayaQuest." This rich interdisciplinary project was described, in part, as follows:

```
During this school year, a kid-directed team of archeologists and bicyclists will be using
the latest technology to help illuminate one of the greatest mysteries of all time: the
collapse of the Ancient Maya Civilization.

Between February and May, 1995, the team will travel through Guatemala, Belize, Honduras
and southern Mexico. On mountain bikes they'll carry Hi-8 cameras, laptop computers and
EXEC*SAT satellite transponders which will connect the team to an on-line audience
featured on Prodigy and the Internet.

Students will be able to help direct the expedition and help answer questions by
archeologists in the field. CNN Newsroom will air weekly reports on the expedition's
progress and students in Minnesota will produce live satellite programs with accompanying
support curriculum available via the Internet. All Internet materials are available via
Gopher, World Wide Web, or e-mail.

                    ************************************
                    *              MAYAQUEST           *
                    ************************************
                  *   Gopher: InforMNs.k12.mn.us/mn-k12    *
                 * WWW: http://InforMNs.k12.mn.us/mayaquest *
                *    E-mail: Mayaquest@InforMNs.k12.mn.us    *
               ************************************************
```

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An equally exciting and sophisticated "vicarious expedition," focused upon astronomical research, was sponsored by NASA in mid-1994 and was dubbed "FOSTER On-line."

```
FOSTER On-line will plug an airborne astronomy missions group into cyberspace. These
researchers fly on NASA's Kuiper Airborne Observatory with an infrared telescope at 41,000
feet; the altitude diminishes problems with atmospheric absorption. The women and men
involved in this research will be based in both Hawaii and California in May and early
June. During this time they hope to share the excitement of a NASA research project with
K-12 classrooms via the Internet.

Frequent project updates will be sent almost every day. Students and teachers will be
encouraged to send question to the team via Email. Various background materials including
articles, lesson plans and images will be made available via gopher and FTP. A video
documentary about the research team will be aired via satellite once per week. The
remainder of this message will provide details on the various components.
```

Information about the project is archived on NASA's Gopher at: **quest.arc.nasa.gov**.

Online expeditions can even help us to track animals' movements. The "Wolf Studies Project," organized by members of InforMNs, a commercial Internet provider in Minnesota, "allowed students and teachers around the world to hear, see, and track radio-collared wolves in the Superior National Forest via the Internet."

Finally, some telefieldtrips can be taken either directly or vicariously via a variety of telecommunications networks, using robotic devices that can be controlled remotely via the Internet. One example of such a forward-thinking project was called "Live From... Other Worlds" project.

'LIVE FROM...OTHER WORLDS' is a miniseries of three interactive television programs, currently targeted for broadcast on December 1, December 3, and December 7, 1993, and airing LIVE at 13:00 hrs. Eastern, 10:00 hrs. Pacific, and 08:00 hrs. in Hawaii. This demonstration project will focus on a fascinating scientific topic: how robot explorers open up areas of this world and others for discovery. It will show how 'telepresence' research being conducted by NASA extends human eyes and minds to the depths of the Antarctic oceans as a prototype for techniques by which humans on Earth will in the future be able to probe the planet Mars. 'LIVE FROM...OTHER WORLDS' will be supported by print and computer materials for students and teachers.

The project will use the rapidly developing capabilities of space technology and satellite television distribution to bring remote sites and dynamic researchers directly into classrooms across America in a series of electronic field trips. The students' guides on these voyages of discovery will be a diverse group of dynamic and eloquent researchers, men and women often in their late 20s and early 30s, who have made scientific achievement their entry ticket to a lifetime of discovery.

The interactive component of the programs will allow some students to question these researchers, live and on-camera. To permit an additional degree of interactivity not practicable during the broadcasts alone, computer-based 'discussion centers' (via mail lists and newsgroups) will be used. This will allow other pupils and teachers to contact scientists seen during the programs through electronic correspondence for further information and with follow-up questions. The e-mail feedback will be organized by PBS LEARNING LINK and by NASA s K-12 NREN Initiative (National Research and Education Network). The online networks also will allow researchers in Antarctica and in America to post daily updates on their activities, allowing students a very personal window on what careers in science are really like. In addition, an archive of relevant materials will be kept online using modern Internet tools (anonymous FTP, Gopher, and WAIS).

[material deleted]

A high point of the three programs will come in the second program when a group of students at NASA s Ames Research Center in California will be able to 'drive' a robot camera system - a Remotely Operated Vehicle or ROV - 10,000 kilometers away, deep under the Antarctic ice. The first program will show why Antarctica serves as an analog for other worlds in space, and how technology being researched there can assist in the exploration of the planet Mars. The third and final program will show cutting-edge NASA research on 'virtual reality,' robotics, and telepresence. Again an opportunity will be provided for live student interaction with expert researchers and advanced technology.

As you can see, the possibilities for this kind of rich, multidisciplinary, multimedia virtual experience are quite powerful.

Pooled Data Analysis

Information exchanges are particularly powerful when data are collected at multiple sites, then combined for numeric and/or pattern analysis. The simplest of these types of activities involve students electronically issuing a survey, collecting the responses, analyzing the results, and reporting their findings to all participants. One such project involved a group of students in St. Claire Shores, Michigan, who polled other students about the time that they spend watching television. Also, a group of students working through the National Student Research Center (mentioned earlier) distributed a "quiz" to test respondents' knowledge about breast cancer. Tenth-grade students studying civil justice in Monroe, Michigan, collected and analyzed responses to a survey of opinions on physician-assisted suicide.

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Pooled data activities have also included projects in which students collect environmental data at numerous and varied sites, then pool and analyze it to reveal patterns that help to address current scientific challenges. For example, Marita Moll's Year 6 students in Ottawa, Ontario, Canada, coordinated an international study of ultraviolet radiation levels, and Michele Wendel's students in Concord, New Hampshire, led an international monitoring project of low-level ozone readings. Jim Meinke's students in Lakewood, California, proposed helping students at other locations create isogonic maps, of the Earth's magnetic fields, with this simple call for participation on the Cleveland Freenet:

```
                INTERESTED IN A NEW WORLDWIDE EXPERIMENT?
              MAPPING THE EARTH'S MAGNETIC FIELD (ISOGONIC)

This experiment can involve many classrooms around the globe in:
    communications
    measurement
    mapping skills
    calculations

It would involve a minimum of equipment at each school (or home)
to conduct the experiment.
    world map
    compass(es)
    night observation of Polaris (North Star), Southern Cross
      for our southern neighbors

The experiment would involve many schools or homes involved in
gathering the data from their latitude and longitude. How far off
is your magnetic data from true north or south in your location?
This data would be transmitted to us here at Lakewood High School
and we would send out a summary so that you could construct a
worldwide magnetic map in your classroom. This would also lead
to discussions on the locations of the magnetic poles as well as
how to draw iso or (equal) lines. It might also lead to discus-
sions of night sky movements around the constellations or how the
magnetic field is thought to be created.

                ARE YOU INTERESTED?
If you are interested in trying such an experiment, drop me a
quick note at the address below.

Jim Meinke -      Lakewood High School
                  bd7658@cleveland.freenet.edu
```

Pooled data projects have also included:

- water acidity projects, in which rainwater or stream water is collected at different sites, tested for acidity, then examined for patterns over time and distance
- tele-election projects, coordinated by several different organizations in the months preceding the 1992 American presidential election, in which students voted electronically, and their candidate choice patterns were compared with the national returns

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- the Global Grocery List project, coordinated by David Warlick from the North Carolina Department of Public Instruction, in which students compare prices of 15 standard items (such as rice, sugar, eggs, and unleaded gasoline), then attempt to deduce reasons for price differences
- the Column Count project, coordinated by Joyce Rudowski, a teacher at the Cincinnati Country Day School, in which students from different cities measure the number of inches devoted to newspaper stories on different topics, then compare space allocations among sites
- the Eratosthenes Experiment, conceived and coordinated by Jim Meinke, in which students from all around the world re-enacted Eratosthenes' geometric procedure that allowed him to estimate the circumference of the Earth by measuring the shadow angle of a stick placed vertically in the ground at noon on the day of the autumnal (or vernal) equinox
- a Monarch butterfly migration project, in which Monarch migration was observed and tracked (by marking the butterflies and collecting samples of migrating butterfly groups) by students in the eastern United States, coordinated by Orley Taylor and Brad Williamson of Kansas State University and Olathe East High School

Clearly, this type of project holds much promise for involving students in large-scale research efforts that use mathematics and scientific methods to answer complex and interesting questions.

Problem-Solving Projects

Problem solving is one of the most beneficial educational opportunities that we can offer students of any age. The Internet can be used to extend cooperative problem-solving activity around the world. Educational problem-solving projects are, as yet, the least common kind of Internet-based activity that involves precollege students, but they are among the best examples of how asynchronous connectivity can be used to support and enrich precollege curricula. Online problem-solving activities can be either competitive or collaborative.

Information Searches

In this type of online activity, students are provided with clues, and must use reference sources (either electronic or paper-based) to solve problems. For example, Tom Clauset of Winston-Salem, North Carolina, developed the "GeoGame" project, in which each of 20 participating groups of students provides the same eight pieces of information about their school's location (i.e., latitude, time zone, population, direction from capital city, etc.). The coordinators of the game then scramble the city names, and all groups use

reference materials, such as maps, atlases, and books, to match the cities with the information sets. The winning class is the one with the most correct matches.

A similar project for children in upper elementary grades was coordinated by Dorothy Whitney and the technology committee at Elsmere Elementary School in Delmar, New York. Called "Where in the World is the Mystery Elementary School?," the project provided sets of clues about fictitious elementary schools in real places in the world, then asked participants to use whatever research tools they had available to deduce the mystery city. Each set of clues contained six types of information. For example,

```
School no. 1 Clues:
Find the location of the mystery school located in this city, country:

Artistic:       One of my museums houses one of the world's finest archaeological
                collections - dig that!
Mathematical:   Some of my monuments are named for the name of the geometric SHAPE they
                are!
Scientific:     I have a very hot, arid climate, with an average annual temperature of 21
                deg C (70 deg F) and average rainfall of 25 mm (1 inch) - dry and hot,
                that's all I've got!
Geographic:     I am the largest city on my entire continent!
Cultural:       Many of my very unique and special historic landmarks, including many
                mosques, cause tourism to be a very important part of my economy. Come one,
                come all!!
Historical:     "Friends, Romans, Countrymen..." - about 2000 years ago, the Romans built a
                fortress called Babylon on my current site.

                WHERE AM I???????????????????
```

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Learning disabled students at Desert View High School created the following activity with the assistance of their teacher, Michael McVey:

```
Date: Sun, 20 Nov 1994 20:06:31 -0700 (MST)
From: an308@freenet.carleton.ca
Subject: A Challenge to All Students: Where Are We?

Dear Students,

My students are ready to challenge you. We have forty postcards to give away (that's all
we can afford right now) to students who are up to our challenge. We will send you a
postcard from our city if you can guess where we are _AND_ send us a set of clues about
your own home. We want you to challenge us too.

Here are the clues. You can try to figure out the answers in teams and make a game of it
or work as a group. Good Luck. ;-)

1. We can see Mexico on a clear day.
2. We rarely get snow.
3. Our city nickname is The Old Pueblo.
4. United States Supreme Court Justice O'Connor comes from our state.
5. Our state's birthday is on Valentine's Day.
6. We live south of the bird that rose from the ashes.
7. Mount Lemmon is in our backyard.
8. Our area code is (200 * 3) + 2.
9. We have 300 days of sunshine a year.
10. We are the southernmost ski area in the United States.

Good luck. We have 40 postcards to give away. Remember though, you must send in a list of
questions for your own home to challenge us.
```

Mr. McVey added a note to potentially participating teachers, suggesting that their students use encyclopedias, atlases, and "the full resources of the Library to answer these questions."

Information search activities can also be of longer duration, and embody rather extensive and sophisticated research, analysis, and communication activities for participating students. A good example is the "What's in a Name?" project that took place during the 1994–95 academic year via KIDLINK interpersonal and informational communications facilities (i.e., the KIDLINK and KIDPROJ discussion lists, the KIDLINK Internet Relay Chat, and the KIDLINK Gopher). The challenge to different groups of participating students in this project is to research particular sets of related names (of people), examine name collections according to particular aspects (such as mythological connections, cultural differences in naming practices, etc.), and then take the results of this collaborative research and analysis and share it electronically through written reports of findings. Din Ghani (din@ghani.demon.co.uk), the organizer of this project from Newcastle upon Tyne, England, provided a detailed and richly-conceived structure for the year-long project, which organizes students' work into multiple and multisite research, analysis, and management work packages.

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Electronic Process Writing

Students in Trevor Owen's (towen@yorku.ca) English classes in Toronto, Ontario, Canada, regularly posted the poems that they have written to newsgroups sponsored by Simon Fraser University, so that other students in Canada could offer feedback in an electronic version of process writing sessions. Mr. Owen has also been able to enlist the assistance of professional writers, such as the poet Lionel Kearns, to offer constructive criticism ... and to sometimes receive some of the same (from the students), in response to pieces in progress. This "Writers in Electronic Residence" project is now supported by York University, and helps students to explore many different types of writing.

Electronically-assisted process writing can also take on other forms. For example, 14- and 15-year-olds from a number of different school sites are now participating in the "Doomed Train" project, organized and facilitated by Francis Achiu (francisa@kalama.doe.hawaii.edu) of Moanalua High School in Honolulu, Hawaii. This project concentrated upon the situation in Bosnia-Herzegovina by asking students to complete the following activities:

```
We plan to ask our students to write a persuasive essay that addresses the question
'Should Bosnia-Hersegovina remain a confederation or be divided into Croat, Muslim and
Serb sections?' The English classes will be divided up into six or seven teams consisting
of four heterogenously grouped students. Each team will be asked to select an ethnic group
and take a side on this question and present their arguments. Thus, we will have one Croat
group arguing for a confederation and another Croat group arguing for separation. The same
will go for the other two ethnic groups so that each team will be different. We plan to
put this lesson and question on the Internet and call for participation. The classes from
around the world can select any of our teams to challenge. Through e-mail the students can
exchange papers and offer rebuttals.
```

Note that this electronic process writing project asks students to concentrate their feedback primarily upon the *content* of each other's writing, while projects, such as "Writers in Electronic Residence," asks writers to concentrate primarily upon the *forms* through which content is communicated. In both cases, rich, geographically unbound, constructively critical exchanges occur.

Sequential Creations

An intriguing kind of artistic problem solving has emerged on the Internet, in which participants progressively create either a common written text or a shared visual image. Yvonne Andres (andresyv@cerf.net) and Mary Jacks, from Oceanside High School in California, for example, helped their students to start a sequential text by encouraging them to write the first few stanzas of a poem about world peace. They then sent their work on to students in a different school, who read the stanzas already written and added their own. This process continued until the poem had circled the world several times, and had grown (understandably) to epic length.

Another type of sequential creation involves progressive construction of visual images. Ed Stastny (ed@cwis.unomaha.edu), from the University of Nebraska at Omaha, organizes such "visual art collaboration exercises" as a series called "Synergy." The following online announcement describes how one of these projects was conducted.

```
   SYNERGY is the name for a continuing series of visual art collaboration exercises
designed to weave the net even more strongly and instigate communication on all levels
between participants.

   CROSSWIRE is the second in the series (the first was REVOLT) and will work like this:

- you send in an original, but unfinished image. This can be done via UUEncoded e-mail,
FTP upload, or by sending in a copy via normal surface post. All images will end up in GIF
or JPG digital format.

- accompanying your original image, you will send a one-or-two-line text description of
your image. If you do not provide one, we will write it. The text description is to be
integrated into a large text file that other participants can browse...deciding which
image they wish to manipulate.

- there are three stages...
STARTER, MANIPULATION, and FINISHED. The initial image you send in is your "starter"
image. Any starter manipulated by another participant is then a "manipulated" image. Any
manipulated image that is manipulated to completion is called a "finished" image.

- a subdirectory called CROSSWIRE will be opened up in the OTIS directory at the FTP site
SunSite.UNC.EDU. On July 12, this directory will be filled with starter images from other
CROSSWIRE participants. You will then choose as many images as you like to manipulate, get
them from the FTP site, and go wild and synergetic.

- when you finish manipulating an image, you will return it to us via e-mail, FTP, or
snail-mail, as described above.
```

If you would like to see some of the results of Synergy's first image creation collaboration, they are posted for anonymous FTP retrieval at: **sunsite.unc.edu** in subdirectory path: */pub/multimedia/pictures/OTIS/collabs/REVOLT*.

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Paul Fretheim (fretheim@guest.nwnet.net) organized students from all over North America in the spring of 1994 to create a "Native American ChainStack." Students at participating sites created *HyperStudio* stacks on the Native American tribes found in their geographic locations, and then combined these stacks into a common interactive resource. John Ost (jost@mv.mv.com) organized students who are participating in a monthly real-time "Writers' Corner" in 1995 and 1996 via the KIDLINK Internet Relay Chat to create a short story online, following this plan:

```
(1) Let's build a short story as a group online. Don't worry about punctuation or anything
other than building a story. So come to the meeting with three nouns, verbs and adjectives
that you'd like to see as part of the story.

For example: nouns →cat, ball, string;
verbs → hit, swat, swallow;
adjectives → big, hard, green.

If I told the story myself, I might write the following:

"I have a big cat named Maryann. Actually, Maryann was a boy cat but I didn't know it so I
named him Maryann. One day he saw a green, hard ball lying in corner. He dashed over to
the ball and swatted it with his paw. The ball shot across the room and suddenly flew back
and hit Maryann right in the nose. "What happened?" He purred to himself. Maryann
carefully nuzzled the ball forward with his nose. To his surprise he saw a long gray piece
of string attached to the ball. ... "

Well, you get the idea. Now when everyone else comes prepared with words, that story won t
just have my nouns and verbs *or my original story idea.* Instead it will be a composite
story that grows as each of us adds our choice of words and ideas to each sentence.

Each one of us will take turns being the narrator and building the sentence from the words
made available by the group.

(Lord knows how this will work if lots of people come to
the meeting. But we'll make it work.)

We can put whatever rules we want on the story telling. But we'll have to decide those
rules when we meet. And those rules can always change - just like they will as you learn
to write your own stories and develop your own style of writing.
```

This activity structure seems to be applied both synchronously and asynchronously, using both text and images, to support intriguing collaborative creative efforts.

Parallel Problem Solving

Using this activity structure, a similar problem is presented to students in several locations, which they solve separately at each site, then share their problem-solving methods electronically. For example, Carmela Federico of New York, New York, presented the following architectural challenge.

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```
What's the tallest structure you can build out of 3/4"-wide popsicle sticks that can:

1) support a Grade A Large egg and
2) withstand the Big Bad Wolf Test (the biggest lungs in the room blow on it as long and
hard as possible; if the structure stands, it passes)?

We at the Playing to Win Saturday Science Project challenge you to come up with
interesting, strong structures to perform this engineering feat!

*Use only Elmer's Glue for adhesive.
*Egg must be hard-boiled, with the shell intact (with yolk inside).

Submit your winning and unusual designs - both written descriptions and either a picture
or gif file - to:

mnk00501@llwnet.linknet.com
(which is WNET's Learning Link, based in NYC)
```

In a similar multisite project, representatives from Tidewater Technology Associates challenged students to "design and construct a launching pad and rocket with recovery system," then "using water and compressed air, launch the rocket, using a raw egg for a payload." They were further instructed to "recover the payload intact" and "use ground-based triangulation to determine the rocket's highest altitude."

Middle school students on the statewide educational telecommunications network in Virginia (VaPEN) participated in an interdisciplinary project called "Puzzle Now!" organized by Heidi Bernard (hbernard@radford.vak12ed.edu). In this project, students from 25 sites within the state solved a common puzzle each week for 8 weeks, comparing not only solutions, but, more importantly, multiple methods for working the problem.

In another parallel problem-solving activity, elementary-level students in different classrooms designed floating boats made out of a 15 cm square of aluminum foil to hold as many pennies as possible, then shared designs, problem-solving procedures, and experiences via electronic mail. This simple, but powerful activity was coordinated by Barbara Leonard (bleonard@chpchat.mich.fred.org), a substitute teacher in central Michigan.

In conjunction with Earth Day observance in the spring of 1994, students in many different grades and schools were challenged by David Warlick (dwarlick@dpi1.dpi.nc.gov) of Raleigh, North Carolina, to become "Eco-Entrepreneurs" by developing "an imaginative new product that could make a profit, but not impact the environment." The product designs had to include use of at least 50% recycled materials. Participating students wrote and submitted "sales pitches" for their products on Earth Day, which David compiled into an all-sites catalog. Participating student groups then used the electronic catalog to select and place fictitious orders for the products that they chose. The "sales statistics" were then sent to all groups for review and discussion.

A powerful implementation of parallel problem solving involves large-scale participation in science experiments. Jim Kuhl, from Central Square Middle School in New York, invited teachers and their students to replicate an environmental science experiment that he calls "Fishy Habits."

```
DO CHANGES IN ENVIRONMENTAL CONDITIONS AFFECT THE BEHAVIOR OF ANIMALS?

Surprisingly, when students are asked this question many say no. Once the FISHY HABITS
experimental procedure has been explained to students they still believe that no changes
will occur in the fish's behavior. Students predict no real change in the behavior of the
fish.

PROCEDURE - After setting up an aquarium containing no more than five fish, students
observe and tabulate the number of times the fish swim to the top of the tank during three
distinct experimental phases. During the first phase, students tally the number of random
trips made to the top of the tank by the fish. During the second phase, students count
trips made to the top when the fish are fed. When feeding the fish during the second
phase, the filter/aerator in the fish tank is unplugged (a strong environmental change).

During the final phase of the experiment, students once again tally trips to the top;
however, the filter/aerator is once again turned off without the addition of food. Will
the fish visit the top of the tank thinking that turning off the filter/aerator means that
food has been added? Join us in a replication of the experiment and find out.

Over the past three years we have 'perfected' this experiment during our unit on animals
and have developed many ways of standardizing our procedures. We wonder if others would
achieve the same results that we have seen.
```

Alan Hodson and Carol Hooper, who coordinate the "MathMagic" project from two middle schools in El Paso, Texas, provide mathematical word problems every two weeks to teams of students to solve, but the teams contain groups of students from different schools in different geographic locations. Therefore, participants must use telecommunications tools to coordinate problem-solving efforts, the selection of solutions to submit for evaluation, and the writing and presentation of these solutions according to a standard format.

Finally, Linda Delzeit (linda@nptn.org), from Academy One on the Cleveland Freenet, has coordinated what she calls the TeleOlympics each spring for several years. On a preset day in May, participating students all over the world compete against others from their own schools in events that involve running, jumping, and throwing. Their teachers then send the results of these events to Academy One so that a "virtual Olympics" can occur, with international winners in each event declared. There are four age/grade group classifications, and special rules have been established for students who use wheelchairs. The activity is organized as follows.

```
Group Classifications:
 Class A = grades 10-12, ages 15-18
 Class B = grades 7-9, ages 12-14
 Class C = grades 4-6, ages 9-11
 Class D = grades 1-3, ages 6-8

List of Events:
 50 m run
 tennis ball throw
 long jump (choose either standing or running for your school)
 400 m run (for all ages)
 800 m run (for Class A and B)
 1600 m run (for Class A participants only)

Educational Activities:

1. Opening and Closing Ceremonies - e-mail exchange.
On the Opening Day, each participating school should send a letter to each and every other
participating school, wishing them good luck. On the Closing Day, letters of
Congratulations should be sent to every other participating school. These letters can
include additional information and questions as desired, and potentially lead to
establishing permanent keypal relationships with these other schools. A list of
Internet/BITNET addresses of all participants will be mailed out before the Opening
Ceremonies and a special mailing list or listserve will be av lable so that messages can
be received by those with e-mail only capabilities.

2. During the weeks before the TeleOlympics, schools are encouraged to post weekly reports
on the progress of training of their athletes, weather conditions, or additional
information of interest. This could include, but is not limited to, stories of the Ancient
Olympics, word searches in any language with the subject being the Olympics, and/or
interviews/stories about athletes from their community who have participated in the
Olympics. Individual athletes also are invited to share their training programs and
results.

3. Participating schools also may begin to contact each other and exchange private e-mail
as the registrations get posted to the Parade of Nations/Schools area of the TeleOlympics
menu in Academy One. Regular updates of who is involved will be mailed to those
participants who have only e-mail contact with Academy One.

4. The top three winners in each of the events and in each of the boys and girls age
classifications can have their names, school identifications, national flags, and a short
biographical sketch posted to the Victory Platform. Teachers will be responsible for
supplying the biographical sketches of all winners. It is advised that these biographies
be one of the educational activities that each student prepares in case they are a winner.
They also can be used to exchange with students in other countries.
```

As might be expected, this is an extremely popular activity.

Virtual Gatherings

Virtual gathering activities bring together participants from different geographic locations and time zones in real time (synchronously) to either participate, virtually "in person," in a computer-mediated meeting, or simultaneously engage, "in spirit," without direct electronic contact, in similar activities at different project sites. Students using the KIDCLUB Internet Relay Chat can participate on most Saturdays, for example, in discussions organized by Patti Weeg (pweeg@source.asset.com). On one Saturday in March 1994, students chatted about what they would do "if they were in charge of the school." Patti

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suggested that they think about the answers to the following questions to help them prepare for the virtual gathering:

```
1.  If I were principal what would I change about our school? Why?
2.  What would I keep the same? Why?
3.  As a student do you feel that your views are respected?
4.  Do you have any part in decision making in any of your classes?
```

In a poignant virtual gathering involving all 67 school districts in Florida, students and teachers observed "A Day Without Art" on the 8th Annual World AIDS Day. Sandy McCourtney (mccours@firnvx.firn.edu) and Sally Lucke, coordinators for the activities, described the "in spirit" aspect of this virtual gathering as follows:

```
THE ACTIVITIES: Schools representing all 67 Florida districts will submit visual and
discourse statements in the form of a blindfold and an awareness statement. These
blindfolds will be draped on the statuary located in the Ringling Museum Courtyard,
signifying the message that at times, regarding AIDS, "we are unaware and cannot see." In
a symbolic gesture, the blindfolds on the museum statuary will be removed, once the on-
site and electronic dialogs have commenced.

THE INVITATION is this:
1. Send an electronic awareness message, a message of support, or, a "factoid" (facts)
related to AIDS and/or,
2. Design a piece of cyberspace-cloth to blindfold one of the statues!
Please limit messages to no more than one screen; if you intend to send a graphic file,
please send an email (text) message to the address below to specify the paint and
compression program you will be using.
```

Virtual gathering activities can incorporate use of multimedia. During the weeks of March 7–13, 1994, for example, students from many different Internet sites helped to build "CitySpace" (http://www.exploratorium.edu), a model of a virtual city hosted by the San Francisco Exploratorium. Students had previously sent in stories, scanned photographs, hand-drawn pictures, audio samples, 3-D models, etc., about the neighborhoods and "imaginary spaces" in which they live. These were then used by teams of students, artists, and developers to create CitySpace, which is continually evolving, and can be explored using online multimedia tools, such as Cornell University's "CU-SeeMe" freeware.

Simulations

Online simulations require the most coordination and maintenance of all activity structures, but the depth of learning possible and task engagement displayed by participants can convince project organizers to spend the additional time and effort necessary to make them work. Notable examples of successful online simulations include Academy One's NESPUT (National Educational Simulations Project Using Telecommunications) activities. These collaborative projects simulate space shuttle launches, historical space missions, space colony design, ozone layer repair, and stock market investments, to name just a few. These activities depend upon person-to-person communication to

create the simulated situation. One NESPUT simulation is "Centennial Launches," described in an electronic newsletter as follows:

```
CENTENNIAL LAUNCHES: Simulated Space Shuttle Program--
At the core of these launches is a permanent full-scale mock-up of a space shuttle (called
the Centennial) complete with "Mission Control" located at University School in Shaker
Heights, Ohio (Cleveland area). Schools around the world take various roles in each
simulated space shuttle mission. These could include being another shuttle (doing a
docking maneuver), secondary mission control, alternate landing sites (weather stations),
solar disturbance observatories, and so forth.

Coordination and communications between the shuttle's mission control and other schools
will be conducted through distributed conferences on the individual NPTN systems.
Electronic mail is sent back and forth, hourly reports are posted, even realtime
electronic "chats" can occur between mission control, astronauts, and supporting units.
```

Another kind of space mission simulation, coordinated by Chris Rowan and Penny Bond from Texas, is shared via a listserv discussion group. It employs a number of different types of synchronous and asynchronous communications media to help students participate in the experience.

```
[ISTE-SS-LISTSERV@UHUVM.BITNET -
International Student Space Simulations

  International Student Space Simulations is an exciting, dynamic teaching method that
challenges students to design, construct, and live in a self-contained habitat for an
extended
period of time. It is a multilevel, interdisciplinary, action-based program that enables
students to apply what they have learned toward the successful "launch," "orbit," and
"splashdown" of an extended space simulation.

  Throughout the simulation, student astronauts communicate with Mission Control
technicians (also students) via two-way radio, modem-equipped computers, and/or VCR
cameras and monitors. Inside the habitat, astronauts perform experiments, work on
previously recorded lessons, engage in simulated docking maneuvers, retrieve and repair
satellites, prepare meals…. The possibilities are endless.
```

An exciting series of simulations in international events and issues and global conflict resolution was sponsored by Catherine Schreiber-Jones and David Crookall of the University of Alabama. Called "Project IDEALS," these simulations placed participating students in the roles of "high-level negotiators representing various countries at an international conference," who must, for example, "hammer out the text of a treaty governing the emissions of CFCs, the use of the ocean's resources, or the future of Antarctica." These exchanges were supported by remote access of sophisticated simulation-management software called *Polnet II*, which was located at the University of Alabama.

Simulations can also be organized around the use of software that creates the virtual worlds that students explore. The National Educational Supercomputing Program (NESP), for example, permits classes of students to use supercomputing facilities at the Lawrence Livermore Laboratory, via remote access, to help them to solve proposed projects in science and mathematics. Sophisticated simulation software, which allows students to explore, for

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example, climate modeling, ray tracing, molecular configuration, or plant growth modeling, is made available to students and teachers at their school sites, along with teacher education materials and curricular integration models. Linda Delzeit (linda@nptn.org) coordinates the National Public Telecomputing Network's participation in this project.

Social Action Projects

It should be no surprise to global citizens living in the end of the twentieth century that the Internet can serve as a context for "humanitarian, multicultural, action-oriented telecommunications projects" (Ed Gragert, I°EARN) that involve the future leaders of our planet: our children.

Mike Burleigh (ubjvm6q@ccs.bbk.ac.uk), for example, organized students via the KIDLINK Internet Relay Chats to participate with his students at the Cedars School in London on a 24-hour telecommunications vigil that helped to raise money for children in Lebanon. He described the activity to potential participants, in part, as follows:

```
Dear KIDLINK friends,

We are one of the KIDCLUBs on KIDPROJ trying to find things which we can do to prove the
KIDLINK fourth question that we are.............
              'thinking globally and acting locally'
..............to make the world a better place.

We have decided to have a sponsored IRC link to raise money which we will send to the
support UNICEF projects in the Lebanon.
There are will be six of us and we will be staging a 24 hour telecommunications vigil at
the Cedars School London UK.

We will be meeting after school on Friday 11th February and will hope to receive messages
of support from KIDLINK people around the world.

This will be reported in the local press. Some of us will be sleeping (the tough ones will
stay awake).
```

Nina Hansen, from the Timothy Edwards Middle School in South Windsor, Connecticut (ahansen@uhavax.hartford.edu), organized students from all over the world to "Save the Beaches" by planning and participating in "beach sweeps." She described the organization of the project, in part, as follows:

```
    The Save the Beaches project is getting underway full force. In order to meet the May
30th deadline, schools are in the process of putting together a schedule and planning
their beach sweeps. Each school is coordinating the project according to what works best
for them. On Lake Erie, teachers were concerned over what types of litter students might
encounter. To help alleviate any health hazards, experts from the State Health Department
were called in to give students tips on what to do should they encounter any potentially
dangerous litter. Here in Connecticut all students will be supplied with rubber gloves and
will be required to wear them during the clean-up. Precautions such as these will ensure
both an educational and safe experience.
    The most exciting aspect of the project is the wide range of locations that will be
participating. At this writing there at least 12 of the United States represented, two
provinces in Canada, and the countries of Brazil, Costa Rica, Denmark, Portugal,
Australia, and Japan have assured us they will be sending data.
```

The "PLANET Project (People Linking Across Networks)" involved a consortium of many large Internet-accessible educational networks. Representatives from each network worked together to create collaborative, meaningful social action projects in which children had primary responsibility for learning about and helping to tackle global issues of critical importance. During the first months of operation, PLANET participants wrote petitions to the United Nations to protest conditions in Yugoslavia, brainstormed ideas about how to address the starvation and political unrest in Somalia, and planned for and carried out fund-raising efforts to raise money to help purchase "rope pumps for villages in Nicaragua that do not have access to clean water."

Seventh-grade students from Edmonds, Washington, decided to offer an incentive to other students to become involved in creative problem solving for global challenges by establishing the "World Connections Fair." This effort was "designed to encourage and empower kids to be actively involved in making the world a better place." The following is a partial description by its creators.

Kids often feel that the world is all mixed up, but feel helpless to do anything about it. They can see answers to some of the world's most pressing problems, but wonder who would ever listen to them. The World Connections Network (WCN) would like them to know that they have the power to make the world a better place. This program is designed to help kids transform their creative thinking into actions that make a difference in their world. It will help them learn the skills they need to solve the social problems they choose.

As an incentive to be socially active in their communities, the WCN sponsors the World Connections Fair creative problem-solving contest, and the prize is a trip to Disneyland.

In classrooms, youth organizations, church groups, or just a few friends, kids work in teams of four or more with adult advisors. Together they think about all the problems with the world - in their communities, country, or anywhere. The team reviews the list of Project Focus Categories and chooses one. Now they learn how to change their world. With help and advice from their advisors and the World Connections Network, they plan and conduct their project.

Afterwards, they prepare a project presentation, using any medium they choose, and submit it to the World Connections Fair selections team. Two teams will be selected worldwide to participate in the fair from each Project Focus Category. Travel arrangements to the fair will be provided for four members chosen to be their team's Ambassadors to the Fair.

[material deleted]

The shape of the world is in their hands. Whether they're concerned about being responsible consumers, protecting endangered animals, feeding hungry people, or stopping the violence in their communities, kids do have the power to change the world. They can make a difference.

Students participating in the National Science Foundation's Global Schoolhouse Project, which was cosponsored by 30 different organizations, used a variety of telecommunications media to share the results of their environmental research and problem solving. Carl Malamud's partial description of the project activity follows.

For the past six weeks, schoolchildren in grades 5 through 8 have been conducting original research on the environment in their communities. With the help of a curriculum developed by the FrEdMail Foundation, they have conducted surveys and tests, have prepared videotapes and other materials, and have read Vice-President Gore's "Earth in the Balance." The children are located in schools in Oceanside, California; Knoxville, Tennessee; Arlington, Virginia; and London, England.

Using the Internet, the children have been exchanging messages with each other using FrEdMail. They also have been using Cornell University's CU-SeeMe videoconferencing software and Sprint audioconference bridges to communicate with each other.

On April 28, they will conduct a videoconference on the Internet to brief each other and national leaders on what can be done about the environment. Several prominent leaders have been invited to participate, and a variety of dignitaries and members of the media have been invited to observe.

Technically, the April 28 videoconference consists of CU-SeeMe running on Macintosh computers (donated by Apple) equipped with a camera. CU-SeeMe sends a videostream to a Sparcstation donated by Sun, which acts as a central reflector, sending the video from one site to the other sites participating in the conference.

The potential for multidisciplinary, forward-thinking, truly collaborative learning when involved in projects such as these is awesome. It also is

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interesting to note that many of the more sophisticated, interdisciplinary, real-life, online problem-solving projects focus their participants' attention on the problem to solve, rather than on the telecommunications technologies used to share information among co-workers. This clear emphasis on curriculum-integrated learning, rather than the technologies that can facilitate that learning, is perhaps one of the characteristics that makes Internet-based problem-solving projects so potentially powerful.

An Educational Telecomputing Archive

Would you like to learn more about any of these innovative educational telecomputing projects? The University of Illinois' College of Education Learning Resource Server has documents available electronically that describe more than 220 telecollaborative educational activities. These files can be located by content area and/or activity structure.

On the World Wide Web, open this URL:

http://www.ed.uiuc.edu/activity-structures/

If you would like to access these resources in Gopherspace, connect to this Gopher:

gopher.ed.uiuc.edu

and choose the following menu options, in this order:

K-12 Learning Resources/

Educational Networking Projects/

Mining the Internet/ or **Judi Harris' Project Archive/**

As you may have noticed while reading about these projects, the ideas behind them are simple, yet powerful. Their power rests in the interconnectedness that participants experience while communicating across what were once geographic and temporal boundaries to collaboratively realize a shared goal. This, along with the energy, enthusiasm, commitment, and patience of the teachers and students who help to bring these plans to life, are probably the keys to their inspiring success.

Chapter 10
Teleresearch Activities

In late 1994, 35% of a nationally representative sample of American K-12 educators reported having access to Internetworked telecomputing facilities somewhere in their school buildings, with 3% of that sample having connections in their own classrooms. Larger schools, or those with enrollments of 1,000 or more students, are about twice as likely to have Internet access, and employ a full-time network administrator compared to smaller schools or those with enrollments of 300 or fewer students (Heaviside, Farris, Malitz, & Carpenter, 1995). More than 40 states now provide public educators with some sort of Internet access (Doty, 1995). Yet connectivity, when present, is still technically primitive: 97% of all schools with access connect to the Global Matrix using modems, and only 21% of schools with access report the availability of graphical user interfaces (Heaviside et al., 1995).

Almost a sixth of all American homes now house a modem connection (National Institute of Standards and Technology, 1994). One research firm predicts that by the turn of the century, approximately 200 million people in the world will have access to the Global Matrix (*Millions Hooked on the Net*, 1995). By the year 2000, between 2 and 20 million K-12 students will use Internetworked resources and tools (Itzkan, 1994-95), via their own accounts, from home and/or school.

Promises and Caveats.

As readers of this book undoubtedly know, the press to provide global Internet connectivity to all K-12 classrooms is on, fueled by local-, district-, state-, regional-, and national-level support of the notion of networked information infrastructures. In late 1994, 67% of U.S. public schools reported having plans to install or upgrade a wide area computer network. Of these, 81% reported that telecommunications were part of their district-level plan, while 48%, 27%, and 19% said that educational telecomputing was part of their school, state, and regional plans, respectively (Heaviside et al., 1995).

Inside the schools with access to the Global Matrix, online facilities are most often available for teachers (85–94% of all globally networked schools) and administrative staff (66–79%). Students can use global telecomputing tools in only 43–54% of all schools reporting Matrix access (Heaviside et al., 1995), often via their teachers' accounts. Yet there appears to be a common assumption that giving students (and teachers) access to the vast number and variety of resources available via the Global Matrix is both important and impending. As Gallo (1994) observed:

> *Although the educational benefits of computer networks are still relatively unknown, the prevailing wisdom in some educational technology circles throughout the country is that the K-12 community needs to be connected to a global network and that once connectivity is achieved, K-12 educators will use the resources not currently available within their classroom walls to enhance their institutional programs and achieve specific educational goals. The underlying premise is that if a network is built that will support educational activities, then every school will want to establish a connection to this network, and teachers in these schools will use the activities to meet the current challenges of education: "If you build it, they will come" (p. 18).*

Although we want students and teachers to be able to access Internetworked information, we are not sure how this access will serve their teaching and learning needs and preferences in the next century.

Particularly in this Information Age, Baltasar Gracian's seventeenth-century assertion rings true: "We live by information, not by sight" (Tripp, 1970, p. 338). Given access, global networks can bring information to the classroom. Will access to information, using computers to organize it, change our schools ... or our thought processes, for that matter? Some, like historian Eugene Provenzo (1986) believe that it will.

> *The widespread use of the computer as a means by which to organize and control knowledge—to maximize human intelligence—is as important a revolution in the history of thought and thinking as the*

> *invention of writing or the Gutenberg revolution with its invention of movable type. (p. 94)*

But can the Global Matrix bring knowledge to students and teachers in our schools? Interestingly, the answer is probably, "No." Surprised? If so, please consider the differences between knowledge and information.

Information vs. Knowledge

Clearly, there is an enormous amount and variety of information available on the Internet. It comes to account holders in many different forms: as text, pictures, video clips, sound files, multimedia documents, and software, and via several different information exchange formats: Gopher, World Wide Web, electronic mail, conferencing, real-time interaction, and direct file transfer. But is this knowledge? Many, like Taylor & Swartz (1991), would say, "No." To these scholars, knowledge is a result of the process of knowing, which can only occur as the learner actively *constructs* what s/he knows, using information in this process. Larsen (cited in Fox, 1991) declares that the confusion between knowledge and information

> *... is perhaps one of the most serious and widespread mistakes in the current use of information technology, and it leads to the attitude that giving students information is identical to giving them knowledge. (p. 224)*

Larsen says that knowledge results when an individual personally transforms information. Knowledge is private, while information is public. Knowledge, therefore, cannot be communicated; only information can be shared. Whenever an attempt to communicate knowledge is made, it is translated into information, which other learners can choose to absorb, act upon, and transform into their own knowledge, if they so desire. Information Age citizens must therefore learn not only how to access information, but also, more importantly, how to manage, analyze, critique, cross-reference, and transform it into usable knowledge. Why is the development of these skills so essential?

Manageable Miscellany?

Let us begin a response to this question with a seemingly simple example. Assume that a student is doing research on whales. What resources are presently available on the Internet that would help with her research? Her first step might be to do a search of Gopherspace using Veronica, which will search document titles and menu options in Gopherspace, returning a menu of results, compiled from many different interconnected Gopher sites, from which she can freely and repeatedly choose. My Veronica search in mid-1995 on this topic returned 172 whale-related items in about 30 seconds, using the Veronica program at the University of Koeln via the client program, *TurboGopher*. The following shows a partial list of what the search returned.

whales 3
Internet Gopher ©1991-1993 University of Minnesota
I like kicking dead whales down the beach
whales
59 FR 11779 Information Relating to Bowhead whales, U.S. Implementation
59 FR 14611 Information Relating to Bowhead whales, Proposed U.S. Positi
59 FR 11779 Information Relating to Bowhead whales, U.S. Implementation
59 FR 14611 Information Relating to Bowhead whales, Proposed U.S. Positi
Introduction to Grey Whales
Project Whales Gr 1
Project Whales Gr 1
Gray Whales
Gray Whales
Whales (Prim./Int. P_1031.e,f)
Whales (Prim./Int. P_1031.e,f)
Whales (Prim./Int. P_1031.e,f)
Whales (Prim./Int. P_1031.e,f)
Whales (Prim./Int. P/I-031.e,f)
Whales (Prim./Int. P/I-031.e,f)
Whales (Prim./Int. P/I-031.e,f)
Whales (Prim./Int. P/I-031.e,f)
whales and ATOC (fwd)
More whales (fwd)
A Long Look at Whales
Beach Whales
Sinking Whales
The Dolphins, the Whales, and the Sprat
I like kicking dead whales down the beach
whales.wav
Toxicity Levels in Beluga whales
Toxicity Levels in Beluga whales 2
whales, sloghs and locks
The Natural History of Whales and Dolphins (Evans)
Whales (Dow)
Whales (Dow)
Whales (Dow)
Whales of the World (Bonner)
Whales of the World (Bonner)
Whales, Dolphins, and Porpoises (Harrison)
Great whales

In the resulting list of 172 documents, programs, and subdirectories, there was a wide range of items, including book references and reviews, discussions about current events involving whales, details of whale research studies underway, sound files of whale songs, descriptions of whale-related videotapes, and reports and pictures created by elementary and middle school children about whales.

In addition, the search yielded pictures and promotional materials about the jazz/pop musical group called the "Nuclear Whales Saxophone Orchestra."

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source code for a VMS program entitled *WHALES.COM*, whale-related product reviews, a brief description of a graduate education course entitled "Whales in the Classroom," a petition that was circulated electronically a year earlier in an attempt to save whales from being hunted by employees of Japanese companies, quite a few server errors, and even a definition for the phrase, "like kicking dead whales down the beach":

```
adj. Describes a slow, difficult, and disgusting process. First popularized by a famous
quote about the difficulty of getting work done under one of IBM's mainframe OSes. "Well,
you *could* write a C compiler in COBOL, but it would be like kicking dead whales down the
beach." See also (fear and loathing).
```

Some of these resources will be helpful to our young researcher. Anything more than a cursory review of others would probably be an unproductive use of her time. How will she be able to discern useful from irrelevant information in the different contexts of different types of school assignments? Moreover, how will she learn to consider and integrate opinion with fact, recognizing the differences between the two?

For example, my Veronica search yielded one article (excerpt follows) that was posted to a discussion group called FISH-ECOLOGY with the subject heading "Deaf Whales."

```
Subject:   deaf whales
Yes, the study proposed to study ocean warming (this was a questionable occurrence?) is
serious. As far as I've heard, they are proposing 195 decibel sounds, six times a day for
a number of years from stations in California (Point Sur) and Hawaii. According to news
reports, these sounds are many orders of magnitude higher than those required to
significantly alter marine mammal behavior, migration, feeding, etc., and will be heard as
far away as (get this) NEW ZEALAND. All this at the cost of $35 million. I think this
money would be better spent in R&D on conventional thermometer technology 8^).
```

The article to which this offered response was neither located nor was there an update on the status of the study proposal found. What will our researcher understand from this document, if anything? Will she incorporate information from a petition (excerpt follows), put online from Australia, proposing collective action against companies wanting to make cetacean breeding grounds into whaling regions into her research?

```
If you're interested in saving whales, please join me in building a huge email petition
which will be presented to the World Whaling Federation in it's next sitting in Mexico,
real soon now (May some time).
The deal is, that there are Japanese companies who wish to make the breeding grounds down
south in the Antarctic, one of the three left in the world, into a whaling region. This
would be most disastrous as there is little possibility of the whales learning of the
other whale breeding areas in time to save the few families (pods) that remain in the
southern oceans as it is. Thus they will be lost for ever.
```

If so, how will she decide to present this information?

188 BEST COPY AVAILABLE

Our young researcher might also use a World Wide Web search tool, such as WebCrawler, to locate information to use in her learning about whales. My WebCrawler search in mid-1995 identified 170 sources of whale-related information in just a few seconds, of which it returned links to 161. The following shows the first Web page resulting from the search.

Although hyperlinked Web pages, rich in information relevant to our network explorer's topic, were certainly located, such as the "Whale-Watching Web" virtual library, and pictures drawn and paragraphs written about marine mammals by elementary-level students at the Blake School in Minnesota, the WebCrawler search, like its Gopherspace cousin, yielded its share of irrelevant material. Whale watching tour schedules and pricing schemes, pictures and biological classifications for different species of whale lice, "document could not be found" error messages, and personal WWW pages that included no more cetacean information than the word "whale" included in one of the author's remarks were found, sometimes with relatively high search result scores. These were intermingled with the information that our researcher's teacher would probably suggest that she explore in more depth.

Is this reason to bemoan the lack of quality control for information that is publicly available, and rapidly multiplying, on a global, distributed, network of networks, sometimes jokingly labeled "the most successful anarchy in history"? Certainly not. Instead, it is cause to recognize the importance of developing and

using higher-order information processing skills. It may well be that these sensibilities will become the keys to successful learning and teaching in the twenty-first century, when the sheer volume and varied nature of easily accessible information will demand the transformation of knowledge from that which was transmitted (at least in theory) to that which will be actively, collaboratively, and critically built by learners.

Information-to-Knowledge Processes

How might we go about teaching our young researcher how to effectively forage her way through such a morass of data, offered in so many forms? Fortunately, library and information specialists have suggested well-conceived "information processing" methods for many years. For example, the Maine Educational Media Association Ad Hoc Committee on Information Skills created a helpful scope and sequence of information skills for the K-12 students in their state (Conant, Carr, Garthwaite, Gregory, Lord, & Allison, 1990). They described the research process in 13 steps:

Pre-Search

1. *Formulate the central question.*
2. *Relate question to prior knowledge.*
3. *Identify key words and names.*
4. *Integrate concepts and state in own words.*
5. *Develop questions to organize search.*
6. *(When needed,) re-explore general resources.*

The Search

7. *Locate resources of information.*
8. *Search for relevant information.*

Interpretation

9. *Select and evaluate information.*
10. *Interpret, infer, analyze, and paraphrase.*

Application

11. *Organize information for applications.*
12. *Apply information for intended purpose.*

Appreciation (ongoing)

13. *Value and enjoy information in various formats.*

(pp. 20-27)

Although all of these steps are important, I would suggest that Interpretation and Application are particularly crucial to success in knowledge-making—using information located on the Internet. It is also important to note that the skills recommended by these authors should be used to locate and process information found in any media, and by any method. Although more critical evaluation and higher-level synthesis may become increasingly necessary for our

students to exercise as they encounter more information in ever more variable formats online, recommendations for well-informed, intelligent research will probably remain the same. The difference in the coming Internetworked society may rest in the necessity of our finally and regularly *following* our information specialists' advice, so that retrieved information can be used to consciously and conscientiously make knowledge.

Telehunting, Telegathering, and Teleharvesting*

How can teachers assist students' knowledge-making? As I suggested in the first part of this chapter, merely accessing information should not be confused with constructing knowledge. The making of knowledge is an active, holistic, and idiosyncratic process for each learner that can be greatly enhanced with a teacher's guidance. Information accessed using the Internet can become some of the elemental substances used by learners to create knowledge, much in the same way as air, water, and light are used by a plant in the process of photosynthesis. Unlike the production of chlorophyll, though, the production of knowledge often benefits from direct, interpersonal assistance. As teachers, we know that it is our responsibility to provide this guidance to our students. Yet, with most of us being newcomers to the overwhelming amount and variety of information available online, how can we know how to do this?

Information Seeking

The usual answer to this question is technological … and insufficient. Information searching programs, such as Veronica in Gopherspace and the variety of search engines (such as WebCrawler) on the World Wide Web are certainly powerful, useful tools that can help our students to locate large numbers of diverse and timely documents. In schools that have the luxuries of easy access and flexible class schedules, students (and teachers) happily "surf the Internet," often impressed with the range, amount, and appearance of all that can be found that is related to a particular area of inquiry. In a sense, we become Information Age hunters and gatherers in cyberspace, sharing news of the richest locations by exchanging addresses and URLs with members of our virtual clans. Yet it is here, at the point of information access, that many current knowledge-creation efforts falter. We find ourselves confronting a much more important educational issue: what students *do* with the information once they locate it. This is the step that needs human interaction and cannot be replaced by mechanical assistance.

In prehistoric terms, how can the fruits of the hunt be turned to food for the clan? Part of the answer to this question lies in the plan for information seeking itself. If students know clearly how they will use the information that they eventually locate, their chances for purposeful searching, rather than aimless surfing, increase. As teachers, we can help our students to formulate and enact these plans. My travels on the Internet have revealed five purposes that students seem to have (often at the apparent suggestion of their teachers) when

engaged in such "virtual foraging." I share them with you now with hopes that these categories will assist your online activity planning.

1. Practice Information-Seeking Skills

Brian Callahan, a teacher working with public television station WHRO in Norfolk, Virginia, organized several grade-level divisions of "The Great Computer Challenge Internet Scavenger Hunt" to help his students collaboratively hone their Internet information-seeking skills during the spring of 1995. The rules for this team-oriented competition, in part, were:

On Your Marks...Welcome to the first ever Great Computer Challenge Internet Scavenger Hunt! There are three parts to the Scavenger Hunt: The Questions, The Log and The Team Defense. Although this is a competition, we're much more interested in helping students learn about the Internet. Please keep teacher involvement to a minimum.

You will have a little over two weeks to answer the questions. Please pay close attention to the submission deadlines on page 2.

The Questions (please see attached page)
Each question has a different point value. Please try to answer every question, but remember: we're interested in not only the right answer, but how you got the answer.

The Log
Each team is required to keep a detailed log telling us how you got your answers. There is no set format for the log - just make sure it tells us everything. The more detailed the log, the better. Even if you don't get the right answer, you'll probably get partial credit for trying.

The Team Defense
On the day of the competition each team will be asked a series of questions by the judges. Team members will be judged on the quality of their responses.

Several of the questions provided to Division 2 teams (grades 4 - 6) were:

2. What is the phone number for VA.PEN? (2 points)
3. What does VA.PEN stand for? (5 points)
7. What are the complete lyrics to "Won't You Be My Neighbor?" (5 points)
(Hint: Mr. Rogers sings the song and makes his home on Learning Link)
10. Who is Linda Berry? Send her an e-mail message. (10 points)

Bonus Question:
13. What month and year, according to the NASA Fleet Manifest, is flight 51 scheduled for? (15 points)

As you can see, the purpose for participation in this activity was for students to practice, reflect upon, and share their Internet-based information-seeking strategies. (We should also hasten to mention, as did Brian in his directions to the eight teams in Division 2, that an additional requirement for the activity was to "HAVE FUN!")

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Information Synthesis

Honing information-seeking skills is an important prerequisite for much of what students will do online that is related to their curricular studies. It should not be forgotten, though, that developing these skills is but a means to an end. The synthesis and evaluation of multiple types, formats, and sources of information are truly at the heart of knowledge construction. Why might a student apply information-seeking skills? Four possible answers follow.

2. Inform Oneself About a Topic of Inquiry and/or Answer a Question

Much online information-seeking serves this purpose. For example, in March through May of 1995, William Gathergood coordinated a well-conceived activity, which he called "The Geography Project—4." (Please note Mr. Gathergood's surname is *not* a topically-referenced, clever writing technique. Had I created a fictional name for this creative teacher, I would have chosen, of course, Gather*well*. ;-)) The primary learning goals for this activity were to:

```
A) hone students' skills in researching scientific and social information and map
interpretation.

B) [encourage] students to communicate with others in other countries.

C) help students to develop an understanding of the differences between scientific fact,
presumption and errors based on misinformation based upon stereotypes and prejudice.
```

Participants were paired with student partners from different countries, then asked to get to know their keypals by sending introductory letters and responding to 30 "icebreaker interview" questions. Then, the project takes on an interesting and powerful dimension. In Mr. Gathergood's words,

After sending this to their partner, the students will then be instructed to learn as much as possible about the other student's country through research. They may look at maps, books, magazines, and any computer-generated data they can find. After the research is complete, each student must write "A Day in the Life of the other student." The paper should include what each student thinks the other student's life is like. What are schools like? What do the students do for fun? What kind of work/responsibilities do they have outside of school? What is family life like? What are most students' attitudes about the future?

These questions should be answered to the best ability of the student who has researched the other country. So If John Smith, of Central Ohio, is working with a student in Japan, he would communicate with a student from there, and then begin research, using as many sources as are available to him. He will then write a paper entitled "A day in the life of _____." The student in Japan will do the same thing, studying the American student.

When the papers are finished, they are sent to the student in that country. When each student receives the paper about their life, they will critique it. Obviously, they will discover mistakes. John Smith may not understand how Japanese life has become modernized while the Japanese student may have false assumptions about what Americans do with their leisure time.

In the critique, each student should point out which observations are correct and which are wrong. Then each will write about what their day-to-day life is really like.

In this way, the students will use research tools to learn about real people in other cultures, and have the opportunity to separate myth from fact - stereotypical prejudice from actual social behavior.

Please note that information-hunting and -gathering often complements telecollaborative activity, as we see in this keypal project. (Educational telecollaborative activity structures were presented in Chapter 9.) In fact, we could argue that information-seeking and -synthesis as discontinuous activities have limited educational benefit for most of our students. Therefore, ways in which located information can be collaboratively examined and critiqued become important to consider.

3. Review Multiple Perspectives on an Issue

Students seem to be convinced that there are discrete and simply-stated answers to many questions. Fortunately, the world is much more complex and interesting than that. Online information-seeking can help students to consider multiple perspectives on issues that they are exploring. For example, Kay Corcoran, a middle school teacher in Mendocino, California, helped her students form questions for historians who contribute to a number of scholarly discussion lists about ancient history to answer. This was a culminating activity, helping sixth- and seventh-grade students to "extend their research ... on ancient history topics."

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The basis for this project is rich and educationally sound. As Ms. Corcoran stated in her project summary,

> To enliven and engage the middle school learner, project-based units based on guided research are a popular feature in the History/Social Science curriculum. Typical research projects utilize the resources of school and community libraries, and students need to learn to read information closely and thoughtfully. With the availability of telecommunication resources for research on chosen topics, they soon discover that "historical fact" is open to interpretation, contradiction and occasional controversy.
>
> As a culmination activity to their research project presentations, those students who have been "critical readers," who have recorded inconsistencies, who have exhausted their resources and have unanswered questions may utilize listservs to provide clarification.
>
> A variety of history listservs abound, and the discussions cover a wide range of topics. Not only will 6th and 7th graders see that ancient history is alive and well, but that "historical fact" is open to interpretation based on evidence. History listservs provide an excellent opportunity for middle school students to observe the give and take of inquiry and to dialogue with the experts.

Alternative perspectives can also be discerned from files of information stored on Internet-accessible servers. Din Ghani, the organizer for KIDLINK's 1994–95 "What's in a Name?" project, for example, posted a list of helpful Internetworked genealogical resources to assist participants worldwide with their online and offline explorations of the etiologies, similarities, and differences among related groups of surnames and naming conventions in different parts of the world. Mr. Ghani, who moderated this richly-conceived telecollaborative, "information search" project from Newcastle upon Tyne in the United Kingdom, also provided a list of offline resources to help participating students locate information about the names or naming practices that they were researching. In this way, he illustrated an important and often-overlooked aspect of the educational use of Internetworked resources.

Information accessed online might be more recent, more varied in form, and perhaps more plentiful than information available locally, but one, no matter how much it is hyped by technocentric advocates, should not replace the other. Instead, *all* kinds of information should be used in combination, and according to what the requirements of each learning situation dictate.

4. Help Students Solve an Authentic Problem

Advocates of constructivist notions of learning and teaching stress the importance of students exploring and finding solutions to real-world, complex problems. Online information-seeking can greatly assist these efforts. This year, for example, Martha McPherson's students in Fort Worth, Texas, used information culled from existing Internet resources, plus data generated through student-written and -administered surveys, and information available via electronic discussions with subject matter experts to discover why the horned lizard is endangered. Her overview of the project read as follows:

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Students will use on-line research and survey instruments to collect data throughout the
United States, Canada, Mexico, and Central America on the Horned Lizard. This information
will be pooled and analyzed to discover reasons why this species is now endangered.
Electronic mentoring will be provided by scientists from Texas A&M.
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Greg Rawls' junior high school students in Conroe, Texas, used online resources to both identify and explore local and larger-scale social problems.

```
The "Problems" program is a student-based, problem-solving project in which students focus
on the process involved in determining interdiciplinary, real-world solutions to local and
societal issues. Students use on-line resources to research a topic; send out surveys to
collect additional data; and, exchange e-mail with experts and content specialists for
guidance. It is expected that the project will be ongoing throughout the year with
students producing a technical paper as a result of their research.
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Gail Carmack's high school biology students used Internet resources via TENET, the Texas Education Network, to explore the scientific and social challenges presented by AIDS and other immuno-suppressive diseases through a well-constructed project entitled Students Exploring Cyberspace (SECs).

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Project SECs will allow biology and social studies students to study AIDS and other
current topics in a multinational, interdisciplinary fashion. Students will use TENET
resources such as Gopher, Veronica, Archie, Telnet, and FTP to research current
information about AIDS pathology, epidemiology, treatment, and social implications.
Additionally, they will communicate with students from other countries through e-mail to
find out how AIDS impacts other societies. They will then produce multimedia packages that
can be used to teach [about] AIDS at feeder junior high schools. High school students will
use TENET newsgroups to mentor junior high students who are also studying AIDS.
```

Note that the culminating activity for these students' exploration of AIDS does not stop with their own edification. Instead, they share the fruits of their new understanding with other students by producing instructional multimedia packages for use by younger students, and using computer conferencing facilities to directly assist these students in their learning. This points to an important goal for use of information collected online: to publish syntheses and critical appraisals of the content from the full range of located resources. In this way, the results of students' explorations can become the information "crops" that other students can harvest.

5. Publish Synthesized and/or Critiqued Information Overviews for Other Students to Use

Perhaps the single most important trend in the evolution of online resources is the development of a technologically simple way for Internetworked explorers to share the fruits of their search-and-synthesis labors worldwide. The most common way to do this is with a locally-maintained, but internationally-accessible World Wide Web (WWW) server. In late August 1995, there were more than 450 K-12 schools in the world with such WWW servers, and this number promises to grow rapidly by the turn of the century. (For more details

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on how to create WWW servers, please see the November 1995 "Mining the Internet" column in *Learning and Leading With Technology*.)

Several teleresearch projects incorporate such publication efforts into the structures of the students' activities. The previously mentioned SECs project, coordinated from LBJ High School in Austin, is one example. The 1995–96 Earth's Crust and Plate Tectonics Project, a multidisciplinary, interdisciplinary, and international effort, organized by Hannah Sivan and David Lloyd from Sde Boker, Israel, requests that students create databases and WWW pages that summarize their discoveries of how phenomena related to plate tectonics appear in their daily lives. And in Project Population, organizer Martha J. Harris from Wayland, Massachusetts, requests that participants examine local historical census data to identify, and eventually explain, "[time] periods of rapid growth or decline." By publishing these local analyses on the Project Population Web page, participants from all over the United States will soon be able to deduce common patterns (and perhaps causes) of population rate changes across sites.

Examples of publishing synthesized online information for educational use are impressively numerous. One has to explore only a few of the many K-12 servers online to see evidence of this trend. Fortunately, "Internet angel" Gleason Sackman has made such exploration easy for us. Just use your Web browser to open this URL:

http://www.sendit.nodak.edu/k12/

This useful Web page contains links to all known K-12 servers, plus sites set up by other organizations for the benefit of precollege students and teachers. It is updated frequently, and supports use of any WWW browser, including Lynx.

Teleharvesting*

Those of you raised in urban environments might be surprised to learn, as I was, that crop harvesting is not comprised primarily of the collection and bundling of mature plants. Instead, it involves mostly the *processing* of gathered crops—getting them ready for sale or consumption.

The same is true for teleharvested information, which has been remotely cultivated, perhaps by groups of K-12 students and their teachers. The effective processing of Internetworked information—that is, its use by learners in the construction of knowledge—is a principal challenge to learners and teachers in the Information Age. Like the ancient farmers who invented agriculture, we have much to learn, and ultimately share, about the art and practice of "infoculture."

**I am indebted to my friend and colleague, Cathy Gunn, a faculty member at the University of Northern Arizona, for her creation of this insightful concept and term.*

197

References

Andres, Y. M., Jacks, M., & Rogers, A. (1991). *TeleSensations: The educators' handbook to instructional telecomputing*. Bonita, CA: The FrEdMail Foundation [P.O. Box 243, Bonita, CA 92002].

Conant, A., Carr, B., Garthwaite, A., Gregory, D., Lord, L., & Allison, S. (1990). *Information skills guide for Maine educators*. Augusta, Maine: Maine State Library Media Services.

Doty, R. (1995). Teacher's aid. *Internet World*, *6*(3), 75-77.

Ellsworth, J. S. (1994). *Education on the Internet*. Indianapolis, IN: SAMS Publishing.

Fox, S. (1991). The production and distribution of knowledge through open and distance learning. In D. Hylnka, & J. C. Belland (Eds.), *Paradigms regained: The uses of illuminative, semiotic and post-modern criticism as modes of inquiry in educational technology* (pp. 217-239). Englewood Cliffs, NJ: Educational Technology Publications.

Gallo, M. (1994). Assessing the effect on high school teachers of direct and unrestricted access to the Internet: A case study of an east central Florida high school. *Educational Technology Research and Development*, *42*(4), 17-39.

Gargano, J. et al. *Mining the Internet* [Machine-readable data file]. (1991). Davis, CA: University of California, Davis, Computing Services [Producer and Distributor].

Gove, P. B. (Ed.). (1986). *Webster's third new international dictionary of the English language*. Springfield, MA: Merriam-Webster, Inc.

Heaviside, S., Farris, E., Malitz, G., & Carpenter, J. (1995). *Advanced telecommunications in U.S. public schools, K-12* (E.D. TABS Publication No. NCES 95-731). Washington, DC: U.S. Government Printing Office.

Itzkan, S. J. (1994-95). Assessing the future of telecomputing environments: Implications for instruction and administration. *The Computing Teacher*, *22*(4), 60-64.

Krol, E. (1992). *The whole Internet: User's guide and catalog*. Sebastopol, CA: O'Reilly & Associates, Inc.

MIDS: Matrix Information & Directory Services. (1995). Summary of the results, second TIC/MIDS Internet demographic survey. *Matrix News*, 5(4), 1-10.

Millions hooked on the net. (1995, April). *NetGuide*, 2(4), 139.

National Institute of Standards and Technology. (1994). *Putting the information infrastructure to work: Report of the Information Infrastructure Task Force Committee on Applications and Technology*. Washington, DC: U.S. Department of Commerce.

Owen, T., Owston, R., & Dickie, C. (1995). *The learning highway: The high school and college student's guide to the Internet*. Toronto: Key Porter Books.

Provenzo, E. F. (1986). *Beyond the Gutenberg galaxy: Microcomputers and the emergence of post-typographic culture*. New York: Teachers College Press.

Quarterman, J. S., & Carl-Mitchell, S. (1995a). Matrix size update. *Matrix News*, 5(1), 6.

Quarterman, J. S., & Carl-Mitchell, S. (1995b). MIDS press release: New data on the size of the Internet and the Matrix. *Matrix News*, 5(1), 1, 5.

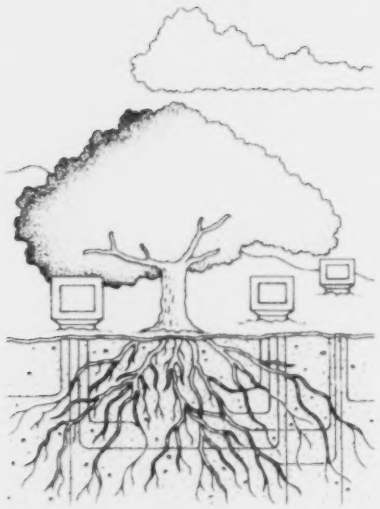
Roberts, N., Blakeslee, G., Brown, M., & Lenk, C. (1990). *Integrating telecommunications into education*. Englewood Cliffs, NJ: Prentice-Hall.

Taylor, W. D., & Swartz, J. D. (1991). Whose knowledge? In D. Hylnka, & J. C. Belland (Eds.), *Paradigms regained: The uses of illuminative, semiotic and post-modern criticism as modes of inquiry in educational technology* (pp. 51-62). Englewood Cliffs, NJ: Educational Technology Publications.

Tripp, R. T. (1970). *The international thesaurus of quotations*. New York: Thomas Y. Crowell Publishers.

Section 4

Appendices



Appendix 1
Recommended Gophers

Academe This Week (The Chronicle of Higher Education)
Articles from the *Chronicle*, job postings, and other information of use to those involved with higher education.
Address: chronicle.merit.edu

American Educational Research Association Gopher
Information on the AERA organization, members, publications, divisions, meetings, and Special Interest Groups, plus online resources for educational researchers.
Address: info.asu.edu
Choose: ASU Affiliate Organizations, then AERA

Apple Higher Education Gopher Server
Information on Apple products, projects, publications, and user groups of interest to those involved with higher education
Address: info.hed.apple.com

Armadillo
"The Texas Studies Gopher, Armadillo, has been designed with the middle school teacher and student in mind, and presents information about Texas' natural and cultural history." Also has an excellent collection of Acceptable Use Policies for educational institutions. Provided by: Rice University.
Address: gopher.tenet.edu
Choose: The World, then All Gophers in Texas, then Armadillo

ARTSEDGE
National network dedicated to the arts in education.
Address: gopher.tmn.com
Choose: ARTSEDGE Information Gallery

AskERIC Virtual Library
"The AskERIC Virtual Library is an Internet site of selected resources for education and general interest. The selection of AskERIC as a Sunsite gives AskERIC the resources to significantly expand the size and scope of the Virtual Library and to add sound, video, and multimedia resources."
Address: ericir.syr.edu

Babson College Gopher
Good variety of information on business and business education.
Address: gopher.babson.edu

Best of Internet for Educators
Excellent collection of education-related Gophers, selected and posted by folks at the Association for Supervision and Curriculum Development.
Address: gopher.ascd.org
Choose: Other Educational Resources, then Selections from the Best of Internet for Educators

CICNet K-12 on the Internet
Internet resources for K-12 teachers and students, including sites (Gopher, WWW, Telnet, FTP, lists), library catalogs, classroom activities and projects, and more. Developed by a doctoral student as a dissertation project.
Address: gopher.cic.net
Choose: Other CICNet Projects and Gopher Servers, then K-12

Clearinghouse for Subject-Oriented Internet Resource Guides
Excellent and comprehensive collection of Internet resource guides presented by topic. Several education-specific guides are included.
Address: gopher.lib.umich.edu
Choose: General Reference Resources, then Internet Guides and Resources, then Clearinghouse for Subject-Oriented Internet Resource Guides

Consortium for School Networking (CoSN)
Established to further the development and use of network technology in K-12 classrooms, this Gopher offers just about everything there is to offer to the K-12 educator, from the novice to the expert. It hosts the archives for COSNDISC, a moderated electronic mail-based discussion group supporting networking at K-12 levels; supports K-12 research, and is a lobby for K-12 "space" on the Internet and NII. One of its primary goals is to provide support for training of teachers in telecommunications and telecomputing in the classroom. (Based on a document by Carolyn Tyson.)
Address: cosn.org

Disability and Rehabilitation Resources
Much information on many different types of physical and emotional challenges and rehabilitation efforts. Includes the EASI (Equal Access to Software and Information) archives, "education and teaching resources," and pointers to other disability-related Gophers.
Address: sjuvm.stjohns.edu
Choose: Disability and Rehabilitation Resources

EE-Link
Environmental education projects and resources, sponsored by the National Consortium for Environmental Education and Training.
Address: nceet.snre.umich.edu

Eisenhower National Clearinghouse
"The Eisenhower National Clearinghouse Curriculum Resources Catalog represents a comprehensive, multimedia collection of materials and programs for K-12 mathematics and science education."
Address: enc.org

Far West Laboratory Gopher
Excellent collection of education-related resources, including information on curriculum, evaluation, funding, hardware and software, Internet reference materials, legislation and policy, technology planning, professional development, and California-specific (CalTIP) resources.
Address: edtech.fwl.org

Florida Tech. Education Gopher
Includes information on search tools, libraries, electronic texts, and selected education-related Gophers and information servers.
Address: sci-ed.fit.edu

InforMNs Gopher
As a service to subscribers and other Internet users, the InforMNs partnership has developed this Gopher server to link people to:
—A variety of InforMNs services and information tools.
—Various Internet resources for K-12 educators (with an emphasis of needs and resources for Minnesota educators).
—General Internet resources accessible by Gopher.
Address: informns.k12.mn.us

INSPIRE Gopher
"The INSPIRE Gopher (INnovative SPI Resources for Educators) is provided as a service of the Office of Superintendent of Public Instruction [of Washington State] to assist K-12 educators in locating useful resources on the Internet." An excellent collection of network Acceptable Use Policies is included.
Address: inspire.ospi.wednet.edu

Institute for Global Communications
"The mission of the Institute for Global Communications, via its ConflictNet, EcoNet, and PeaceNet networks and its global partnership with the Association for Progressive Communications, is to enhance the possibilities of increased cooperation and collaboration between organizations around the world seeking peace, environmental sustainability and economic justice.
Thus, this Gopher education menu, which will change over time, is aimed at providing access to educational resources that empower people to make a positive difference in the planet's future."
Look here to find information about the International Education and Resource Network (I°EARN), the Global Rivers Environmental Education Network (GREEN), KIDLINK, the International Arctic Project, and much more.

Address: gopher.igc.apc.org
Choose: Organizations on the IGC Networks Gopher

International Society for Technology in Education (ISTE)
Well-organized collection of resources related to ISTE publications and events, including "Educational Technology News," "Distance Education," "School-Home Connections," "Ed. Technology Conferences," and "ISTE Special Projects."
Address: interact.uoregon.edu
Choose: Institutes, Projects, and Centers, then International Society for Technology in Education

Internet Wiretap
Large collections of electronic books, government documents from many countries, and other full-text resources available on the Internet.
Address: wiretap.spies.com

K12Net Gopher
"K12Net is a loosely-organized, totally decentralized network of school-based/oriented "electronic bulletin board systems" (BBSs) throughout North America, Australia, Europe, and the USSR, which share curriculum-related conferences or "echo forums," making them available to students and educators at no cost and usually on a local phone call.
K12Net provides millions of teachers, students, and parents in metropolitan and rural areas throughout our planet with the ability to meet and talk with each other to discuss educational issues, exchange information, and share resources on a global scale."
Address: woonext.dsrd.ornl.gov
Choose: Docs, then k12net

Learning Resources Server
Excellent collection of K-12 educational materials offered by Jim Levin, Michael Waugh, and their students at the University of Illinois.
Address: gopher.ed.uiuc.edu

Media Literacy Online Project
"The project's goal is to make online information and resources available to educators, producers, students, parents, and others interested in the influence of electronic media on children, youth, and adults. This stop on the information

highway has been designed to encourage exploration and to increase awareness and knowledge about media literacy."
Address: interact.uoregon.edu
Choose: Institutes, Projects, and Centers, then Media Literacy Project

National School Network Testbed
Good collection of K-12 Internet project and resource information, sponsored by Bolt, Beranek, and Newman's NSF projects.
Address: copernicus.bbn.com
Choose: National School Network Testbed or K-12 in the Internet

NASA's Quest Gopher
A large storehouse of high-quality educational materials, including Internet resources appropriate for K-12 use and curricularly based units and activities that incorporate use of telecomputing tools and were written by classroom teachers.
Address: quest.arc.nasa.gov

National Center on Adult Literacy (NCAL)
Helping educators, parents, and businesses try to define and address the issues surrounding US literacy levels, the National Center on Adult Literacy's (NCAL) Gopher site housed at the University of Pennsylvania is an excellent resource and forum. The site's information focuses on multiple facets of the literacy problem—making the NCAL a useful resource for teachers of most subjects on most levels. Using the NCAL Gopher equips educators with information from primary sources rather than secondary sources, enabling them to initiate conversations with business leaders, parents, and peers on a more professional level. (Based on a document by Carolyn Canon.)
Address: litserver.literacy.upenn.edu

NYSERNet & NYSED Gophers
These Gophers, provided by the New York State Educational Network and the New York State Education Department, offer Internet-related resources for K-12 and university teachers wishing to use telecomputing tools for professional development and instruction.
Address: nysernet.org
unix5.nysed.gov

Ohio Education Computer Network Gopher
Collection of educational resources organized primarily for use by K-12 *students*, and secondarily by school staff. Includes a "Government Center,"

"Library Center," "Reference Center," "School House" (with pointers to resources organized by curriculum topic), and "Weather Center."
Address: nwoca7.nwoca.ohio.gov

ORNL K-12 Education Server
This Gopher is operated by the Office of Science, Education, and External Relations at the Oak Ridge National Laboratory (ORNL), Tennessee. Its purpose is "to assist teachers, librarians, administrators, and students in locating information related to ORNL educational activities and to provide K-12 teachers with relevant information useful in education." Such information includes: Grants and Funding Opportunities, the Oak Ridge Educational Network, and the regional Wide Area Network operated by ORNL for K-12 education, useful K-12 software in the public domain, and other technologies that are promising for classroom use. (Quoted from a document written by Yiasemina Karagiorgi.)
Address: woonext.dsrd.ornl.gov

Purdue Online Writing Lab
Many full-text resources on writing and writing instruction. Subdirectories include collections of documents on research, resumes, business writing, parts of speech, punctuation, sentences, common mistakes, word choice, and English as a second language.
Address: owl.trc.purdue.edu

Ralphe Bunche School Gopher
Student-run Gopher from a "school within a school" in Harlem, New York City. Much student work online, including newspaper stories, "Shadows Science" projects, and student introductions.
Address: ralphbunche.rbs.edu

Reading Room
A large collection of journals, newsletters, and texts (as well as access to other subject-related Gophers) at the University of Maryland.
Address: info.umd.edu
Choose: Educational Resources, then Academic Reading Room

Scholastic Internet Server
Electronic curriculum resources for K-12 teachers and students, including lesson plans, activity guides, research, and resource material in language arts,

science, and technology. Educational software, links to other Internet resources, and education-related discussion forums are also available here.
Address: scholastic.com 2003

Technology and Information Educational Services (TIES)
A large selection of K-12 educational technology resources.
Address: tiesnet.ties.k12.mn.us

TERC (Technology in Education Research Center)'s Hub
"The Hub is an Internetworked resource for mathematics and science educators operated by TERC on behalf of the Regional Alliance for Mathematics and Science Education Reform. Our goal is to transform the technological potential of recent developments in telecommunications into services of value to policy-makers, educators, administrators, and students in the Northeast and Islands."
Address: hub.terc.edu

Texas Education Network (TENET)'s Gopher
K-12 education-related resources, in-state and around the world, provided by the largest and one of the oldest statewide K-12 educational telecomputing networks.
Address: gopher.tenet.edu

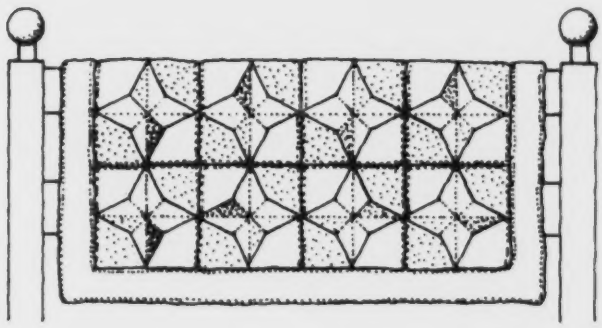
U.S. Department of Education
Many education-related resources, made available by the U.S. Department of Education.
Address: gopher.ed.gov

U.S. Senate's Gopher Server
Information, including electronic mail addresses, for Senators and Senate committees.
Address: ftp.senate.gov

University of Illinois Weather Machine
Provides current conditions, National Weather Service forecasts, severe storm warnings, flood summaries, earthquake bulletins, upper air conditions, satellite images, and more, for the 50 states, Canada, Mexico, and the Caribbean.
Address: wx.atmos.uiuc.edu

University of Massachusetts' K12 Gopher
Huge, well-organized collection of resources usable by K-12 students and teachers, including language arts, social studies, science, news, fine arts, Internet resource, conference, grant, legislation, and telecommunications projects information.
Address: k12.ucs.umass.edu

University of North Carolina's "Library Without Walls"
Extensive, very well-organized collection of resources, organized like a virtual library. Visitors can explore the "Reference Desk," "Study Carrels" (which contain collections of information organized by disciplinary area), "Electronic Journals and Books," and "Software Tools."
Address: dewey.lib.ncsu.edu



Appendix 2
Recommended World Wide Web Pages

ABZU: Ancient Near East Resources
http://www-oi.uchicago.edu:80/oi/dept/ra/abzu/abzu.html

AIDS Education Training Project
http://www.ach.uams.edu/~bnd/aids

American History
http://lcweb2.loc.gov/amhome.html

Anatomy Image Browser
http://www.vis.colostate.edu/cgi-bin/gva/gvaview/

Armadillo (K-12 science, history, and more)
http://chico.rice.edu/armadillo/

ArtResources
http://www.ftgi.com

ARTSEDGE (Arts in Education)
http://artsedge.kennedy-center.org

AskERIC Library
http://ericir.syr.edu

"At-Risk" Institute
http://www.ed.gov/prog_info/at-risk/

BABEL: Computer-Oriented Abbreviations and Acronyms
http://www.access.digex.net/~ikind/babel95c.html

Bartlett's Familiar Passages, Phrases, and Proverbs
http://www.cc.columbia.edu/acis/bartleby/bartlett/

BBC Education Online
http://www.bbcnc.org.uk/education/

Benjamin Franklin
http://sln.fi.edu/franklin/rotten.html

Berit's Best Sites for Children
http://www.cochran.com/theosite/ksites.html

Berkeley Public Library's Index to the Internet
http://www.ci.berkeley.ca.us/bpl/bkmk/index.html

Biodiversity and Biological Collections
http://muse.bio.cornell.edu

Biographical Dictionary
http://www.mit.edu:8001/afs/athena/activity/c/collegebowl/biog_dict/intro.html

Biology
http://galaxy.einet.net/galaxy/science/biology.html

Blacksburg, VA Electronic Village
http://crusher.bev.net/

Blind Children's Center
http://www.blindcntr.org/bcc

Blue Dog Math (doggie calculator; barks the answers)
http://fedida.ini.cmu.edu:5550/bdf.html

Book Nook (children's book report repository)
http://i-site.on.ca/isite/education/bk_report/

Campaign Central
http://www.clark.net/ccentral

Carlos' Interactive Coloring Book
http://robot0.ge.uiuc.edu/~carlosp/color

Career Center
http://occ.com

Career Magazine
http://www.careermag.com/careermag/

Career Mosaic
http://www.careermosaic.com:80/

Chance Database (probability and statistics)
http://www.geom.umn.edu/docs/snell/chance/welcome.html

Chemistry
http://www.chem.ucla.edu/chempointers.html

Children Now
http://www.dnai.com/~children

Children's Literature Web Guide
http://www.ucalgary.ca/~dkbrown/#teachers

Children's Medical Center of the University of Virginia
http://galen.med.virginia.edu/~smb4v/cmchome.html

Children's Writing Resource
http://www.mindspring.com/~cbi/

China's History
http://darkwing.uoregon.edu/~felsing/cstuff/history.html

Civil War Information, Documents, and Archive
http://www.access.digex.net/~bdboyle/cw.html

Civil War Letters
http://www.ucsc.edu/civil-war-letters/home.html

Classroom Web
http://www.wentworth.com/classweb/

Clearinghouse for Subject-Oriented Internet Resource Guides
http://www.lib.umich.edu/chhome.html

Clipart Archive
http://www.cs.yale.edu/html/yale/cs/hyplans/loosemore-sandra/clipart.html

CMC Information Sources—Education
http://www.rpi.edu/internet/guides/decemj/icmc/applications-education.html

CNIDR WWW Servers for Education
http://k12.cnidr.org/

College Prep Page
http://www.tpoint.net/~jewels/college.html

Communications Archive (including IRC chats archive)
http://sunsite.unc.edu/dbarberi/communications.html

Consortium for School Networking
http://digital.cosn.org/

Copyright Clearance Center
http://www.directory.net/copyright/

Countries Home Page Index (CityNet)
http://www.city.net/countries/

CoVIS Geosciences Web Server (K-12 science)
http://www.covis.nwu.edu

Currency Converter (international)
http://gnn.com/cgi-bin/gnn/currency

CyberKids
http://www.mtlake.com/cyberkids/

DeafWorld Web
http://www.computel.com/deafworld/

Dinosaurs
http://rs6000.bvis.uic.edu:80/museum/dna_to_dinosaurs.html

Discovery Channel & The Learning Channel
http://ericir.syr.edu:80/discovery/

Disney (Buena Vista MoviePage) Home Page
http://www.wdp.com

Distance Education Clearinghouse
http://www.uwex.edu/disted/home.html

Dolphin Page
http://mingus.loni.ucla.edu:1028/furmanski/dolphin2.html

Doty's Education Page
http://www.netaxs.com/people/rdoty/

Earth Science Education Resources
http://www.ems.psu.edu/relatedwebsites.html

Earth Viewer
http://www.fourmilab.ch/earthview/vplanet.html

EASI: Equal Access to Software and Information
http://www.rit.edu/~easi

Echo Eurodictatutom (language translation tool)
http://www.uni-frankfurt.de/~felix/eurodictautom.html

Education: K-12 (Yahoo)
http://www.yahoo.com/education/k_12

Education Resources
http://www.clark.net/pub/lschank/web/educate.html
http://www.teleport.com/~vincer/starter.html#schools
http://www.sju.edu/~milliken/demos/hot-educ.html
http://www.highway1.com.au/education/
http://www.wwu.edu/~n9444157/ed.html

Educational Electronic Mailing Lists
http://www.asd.k12.ak.us/edlistservs.html

Educational Technology Virtual Library
http://tecfa.unige.ch/info-edu-comp.html

Educators' Resource Center
http://www.dpi.state.nc.us/tchrsrccntr.html

EDUCOM
http://educom.edu/

EdWeb Project
http://edweb.cnidr.org:90/

Electronic Frontier Foundation Archives
http://www.eff.org/

The Electronic Postcard
http://postcards.www.media.mit.edu/postcards/

Engines for Education (Roger Schank)
http://www.ils.nwu.edu/~e_for_e/nodes/i-m-intro-zoomer-pg.html

Environmental Education ("Online Learning")
http://www.nceet.snre.umich.edu/computers/ol.html

English as a Foreign Language Magazine
http://www.u-net.com/eflweb/

English-German, German-English Dictionary
http://calamity.rz-berlin.mpg.de/eg.html

English-to-Spanish Dictionary
http://www.willamette.edu/~tjones/forms/spanish.html

ERIC Online
http://www.aspensys.com/eric2/welcome.html

Explorer Math & Science Education Initiative
http://unite.ukans.edu/

Federal Law and Information
http://www.law.emory.edu/federal/

Federal Web Locator (index to federal government sites)
http://www.law.vill.edu/fed-agency/fedwebloc.html

FedWorld (U.S. Federal Government)
http://www.fedworld.gov

1492—An Ongoing Voyage
http://sunsite.unc.edu/expo/1492.exhibit/intro.html

France and French Language Web
http://web.cnam.fr/fr/

Franklin Institute Science Museum
http://sln.fi.edu/

French-English Dictionary (ARTFL Project)
http://tuna.uchicago.edu/forms_unrest/fr-eng.html

French Lessons
http://teleglobe.ca/~leo/french.html

French Pages (in French)
http://web.cnam.fr/fr/welcome.html

Frog Dissection
http://curry.edschool.virginia.edu/~insttech/frog/menu.html

Genealogy Page
http://www.everton.com/

Geometry Center
http://www.geom.umn.edu

Geometry Forum
http://forum.swarthmore.edu/

GeoSim Project
http://geosim.cs.vt.edu/index.html

Getting U.S. Teachers Online
http://quest.arc.nasa.gov/online/table.html

Global Encyclopedia
http://204.32.22.16

Global Network Navigator (education menu)
http://gnn.com/gnn/wic/ed.toc.html

Global Schoolhouse Project
http://k12.cnidr.org/gsh/gshwelcome.html

Global SchoolNet Foundation (previously FrEdMail Foundation)
http://gsn.org/gsn/gsn.home.html

Global Show-n-Tell
http://emma.manymedia.com:80/show-n-tell/

Global Student News
http://www.jou.ufl.edu/forums/gsn/

GLOBE Program (environmental education and science partnership)
http://www.globe.gov/

Hands On Children's Museum
http://www.wln.com/~deltapac/hocm.html

Health Explorer
http://hyrax.med.uth.tmc.edu/ptnt/tocptnt.htm

Higher Education WWW Site Index
http://www.mid.net/higher

Hindi Resources and Lessons
http://philae.sas.upenn.edu/hindi/hindi.html

Holocaust Memorial Museum (U.S.)
http://www.ushmm.org:80/index.html

Homeschooling Resources
http://www.armory.com:80/~jon/hs/homeschool.html

Homework Page (topic-referenced collections of resources)
http://www.tpoint.net/~jewels/homework.html

HTML Crash Course for Educators
http://www.educ.msu.edu/admin/guide.html

HTML Introduction
http://www.cwru.edu/help/introhtml/toc.html

Human Lanugages Page
http://www.willamette.edu/~tjones/language-page.html

ICONnect: Connecting Learners to Information
http://ericir.syr.edu/iconn/ihome.html

In Site: New Internet Site Additions (primarily for library & infospecialists)
http://www.mcs.com/~jcr/insite.html

InfoZone (assistance with online research)
http://www.mbnet.mb.ca/~mstimson

Instructional Technology Resources
http://interact.uoregon.edu/medialit/itf/itresource

Integrating Technology in Schools
http://www.unm.edu/~jeffryes/its.html

Intercultural E-Mail Classroom Connections (keypal locator service)
http://www.stolaf.edu/network/iecc/

International Food Information Council
http://ificinfo.health.org/

International Student Newswire (ISN KidNews)
http://www.umassd.edu/specialprograms/isn/kidnews.html

Internet Advocate (resources guide for librarians and educators)
http://silver.ucs.indiana.edu/~lchampel/netadv.htm

Internet Course Syllabi
http://www.bgsu.edu/departments/tcom/syllabi.html

Internet Guide (young person's)
http://www.osc.on.ca/kids.html

Internet Learning Center
http://www.well.com/user/learning/

Internet Public Library
http://ipl.sils.umich.edu/

Internet Relay Chat (IRC) Information
http://www2.undernet.org:8080/~cs93jtl/irc.html

Internet Service Providers (by area code)
http://thelist.com/

Internet Statistics
http://www.netree.com/netbin/internetstats

Internet Training Resources
http://www.brandonu.ca/~ennsnr/resources/

InterNIC Archives
http://ds.internic.net/

Jamie McKenzie (Bellingham, WA, Public Schools)
http://www.pacificrim.net/~mckenzie

Jan's Favorite K-12 Resources & Projects
http://www.state.wi.us/agencies/dpi/www/jans_bkm.html

Japan Information Server
http://fuji.stanford.edu/

Jason Project
http://seawifs.gsfc.nasa.gov/scripts/jason.html

K-12 Cyberspace Outpost
http://k12.cnidr.org/janice_k12/k12menu.html

K-12 Schools on the Web
http://www.nodak.edu/k12/

KIDLINK World Network
http://www.kidlink.org/

KIDLINK Worldwide Computer Art Exhibition
http://www.uc.edu/~kidart/

KidPub (publications by children)
http://www.en-garde.com/kidpub/

KidsCom (for children 8–14)
http://www.kidscom.com/

Kids' Corner
http://www.ot.com/kids/

Kids Did This! Hotlist
http://sln.fi.edu/tfi/hotlists/kids.html

Kids on Campus
http://www.tc.cornell.edu:80/kids.on.campus/wwwdemo/

Kids on the Web (sites that offer information for and about kids)
http://www.zen.org/~brendan/kids.html

Kids Web (digital library for kids)
http://www.npac.syr.edu/textbook/kidsweb/

Learning and Instructional Theories ("Theory Into Practice")
http://gwis2.circ.gwu.edu/~kearsley

Learning Resources Server (University of Illinois; includes "Mining the Internet" articles and educational telecomputing activity structures)
http://www.ed.uiuc.edu/

Legislative Information: THOMAS
http://thomas.loc.gov

Le Louvre
http://sunsite.unc.edu/louvre

Library of Congress
http://lcweb.loc.gov:80/homepage/

Links for Kids (Ryan's & Alisha's)
http://www.webfeats.com/illusion/index.html

Lite-Brite
http://www.galcit.caltech.edu/~ta/lb/lb.html

Macintosh Educators' Page
http://www.netins.net/showcase/macintosh

Math and Science Gateway (Cornell Theory Center)
http://www.tc.cornell.edu/edu/mathscigateway/

Mathematics History Archive
http://www-groups.dcs.st-and.ac.uk:80/~history/

Mathematics Problems Internet Center
http://www.mathpro.com/math/mathCenter.html

Mathematics Virtual Library
http://euclid.math.fsu.edu/science/math.html

Medieval Studies Server: The Labyrinth
http://www.georgetown.edu:80/labyrinth/labyrinth-home.html

Mexican Spanish Lessons
http://www.willamette.edu/~tjones/spanish/spanish-main.html

MidLink Magazine (for middle-grade children, ages 10–15)
http://longwood.cs.ucf.edu:80/~midlink/

Military History
http://kuhttp.cc.ukans.edu:80/history/milhst/m_index.html

MIT Media Lab
http://www.media.mit.edu/

Multimedia File Formats on the Internet
http://ac.dal.ca/~dong/contents.html

Music Virtual Library
http://syy.oulu.fi/music.html

Music Educator's Home Page
http://athena.athenet.net/~wslow/index.html

Myths and Legends
http://theocean.uoregon.edu/~myth/

NandoNext Online Student Newspaper
http://www.nando.net/links/nandonext/next.html

NASA Network Applications and Information Center
http://naic.nasa.gov/naic/

NASA Online Educational Resources
http://www.gsfc.nasa.gov/nasa_online_education.html

NASA's Kennedy Space Center
http://www.ksc.nasa.gov:80/

National Center for Health Statistics
http://www.cdc.gov/nchswww/nchshome.htm

National Public Telecomputing Network (Academy One: K-12)
http://www.nptn.org/

Nationwide School Weather Network
http://aws.com/

National Schoolnet Atlas (Canada)
http://www-nais.ccm.emr.ca/schoolnet

Natural History Web
http://nmnhwww.si.edu/nmnhweb.html

NCSA SuperQuest (high school science and mathematics)
http://www.ncsa.uiuc.edu/edu/superquest/sqt/index.html

Net-Happenings
http://www.mid.net:80/net/

Newton's Apple Educational Materials
http://ericir.syr.edu/newton/welcome.html

Newton Bulletin Board System for Educators
http://www.newton.dep.anl.gov/

Nine Planets Multimedia Tour
http://seds.lpl.arizona.edu/nineplanets/nineplanets/nineplanets.html

Northwest Regional Educational Laboratory
http://www.nwrel.org

Online Educational Resources
http://www.nas.nasa.gov/hpcc/k12/edures.html

Oxford English Dictionary
http://www.uiuc.edu/cgi-bin/oed

Pathways to School Improvement
http://www.ncrel.org/ncrel/sdrs/pathwayg.htm

Peterson's (Undergraduate) Education Center
http://www.petersons.com:8080

Philosophy (Valdosta State University)
http://www.valdosta.peachnet.edu/~rbarnett/phi/

Physics
http://white.nosc.mil/physics.html

Physics Unbound
http://uptown.turnpike.net/l/lindeman/physics_ub.html

Poetry
http://www.yahoo.com/art/literature/poetry/

Project Cape Town: Education and Integration in South Africa (multimedia teaching case)
http://curry.edschool.virginia.edu:80/~tedcases/home.html

Project Gutenberg (full-text books, etc.)
http://jg.cso.uiuc.edu/pg_home.html

Public Broadcasting System (PBS)
http://www.pbs.org

San Francisco Exploratorium
http://www.exploratorium.edu/

Satellite Weather Images
http://www.geo.ed.ac.uk/home/weather.html

Scholastic Central (Scholastic Network)
http://www.scholastic.com/

School Psychology Resources Online
http://mail.bcpl.lib.md.us/~sandyste/school_psych.html

Science and Math Education Resources
http://www-hpcc.astro.washington.edu/scied/science.html

Science Bytes
http://loki.ur.utk.edu/ut2kids/science.html

SciNet Photos (science photograph archive)
http://www.scinetphotos.com

Search Engines (W3)
http://home.netscape.com/escapes/internet_search.html
http://www.uta.fi/~samu/search_engines.html
http://www.clark.net/pub/global/search.html
http://www.earthlink.net/~shurie/search.htm
http://ugweb.cs.ualberta.ca/~mentor02/search/search-all.html
(This is a comprehensive, but slow-loading site.)
http://www.amdahl.com/internet/meta-index.html
http://w3.nai.net/nai_engines.html
http://gagme.wwa.com/~boba/search.html
http://www.cfa.org/search.html
http://www.ciwemb.edu/links/w3_search_source.html
http://spvnorpre.nlh.no/search.htm
http://biop.ox.ac.uk/www/engines.html
http://www.cass.usu.edu/search.html
http://ic.corpnet.com/~aking/webinfo/search.html
http://webnet.mednet.gu.se/search-engines.html
http://www.cta.com/searchpage.html
http://www.vitinc.com/search.html

SeaWorld's Animal Information Database
http://www.bev.net/education/seaworld/homepage.html

Scholastic, Inc.
http://www.scholastic.com

Shakespeare: Complete Works
http://the-tech.mit.edu/shakespeare/works.html

Simple School Internet Protocol (setting up networking in K-12 schools)
http://www.cvu.cssd.k12.vt.us/k12tech/k12tech.htm

The Smithsonian Institution
http://www.si.edu

Social Studies/Social Science Education (ERIC Clearinghouse)
http://www.indiana.edu/~ssdc/eric-chess.html

Social Studies Resources
http://www.halcyon.com/garycres/sshp/startup.html

Soviet Archives (Library of Congress)
http://sunsite.unc.edu:80/pjones/russian/soviet_archive_introduction.html

Spanish Services Directory
http://www.indra.com/jewels/cybercom/netopen/es/index.html

StreetCents: Information for Youth Consumers
http://www.screen.com/streetcents.html

Teacher Education Internet Server
http://curry.edschool.virginia.edu:80/teis/

Teachers Helping Teachers
http://north.pacificnet.net/~mandel

Teacher Talk (teacher conferencing online)
http://www.mightymedia.com/talk/working.htm

Teacher Topics (info on common K-12 unit topics)
www.asd.k12.ak.us/andrews/teachertopics.html

Technical Education Research Center (TERC: math. & science ed.)
http://hub.terc.edu

TeleGarden
http://www.usc.edu/dept/garden/

TeleRead E-Books
http://www.clark.net/pub/rothman/telhome.html

TERC's Hub (math. and science education)
http://hub.terc.edu

"The Big Picture" (educational posters)
http://www.bigpicture.com/abc

Time/Warner Pathfinder
http://www.pathfinder.com/

Tips for Web Spinners
http://gagme.wwa.com/~boba/tips1.html

Treasures of the Czars: Florida International Museum
http://www.times.st-pete.fl.us/treasures/tc.lobby.html

Uncle Bob's Kids' Page
http://gagme.wwa.com/~boba/kids.html

University of Texas at Austin
http://www.utexas.edu

University of Virginia Education Library
http://curry.edschool.virginia.edu:80/~library1/

U.S. Bureau of the Census
http://www.census.gov

U.S. Color Relief Map
http://www.zilker.net/~hal/apl-us/

U.S. Department of Education/OERI
http://www.ed.gov/

U.S. Geological Service Education Resources
http://internet.er.usgs.gov/education/index.html

Universal Survey of Languages (beginning linguistics)
http://www.teleport.com/~napoleon/natlang.html

Unofficial Internet Book List
http://www.northcoast.com/savetz/blist.html

Viking World
http://www.demon.co.uk:80/history/index.html

Virtual English Language Center (ESL services)
http://www.comenius.com/index.html

Virtual Hospital
http://indy.radiology.uiowa.edu/

Vocal Point Student Newspaper (Boulder, CO)
http://bvsd.k12.co.us/cent/newspaper/newspaper.html

Volcano World
http://volcano.und.nodak.edu

War Images
http://www.essex.ac.uk/law/human-rights/images

Weather (Penn State University)
http://www.ems.psu.edu/wx

WebABLE (for persons with disabilities)
http://www.webable.com/

Web Developers' Virtual Library
http://www.stars.com/

WebEd K-12 Curriculum Links
http://badger.state.wi.us/agencies/dpi/www/webed.html

WebMuseum (museums of the world via the WWW)
http://mistral.enst.fr/

Web 66 K-12 WWW
http://web66.coled.umn.edu/

White House
http://www.whitehouse.gov/

Women in Computing Resources (Ada Project)
http://www.cs.yale.edu/html/yale/cs/hyplans/tap/tap.html

World Communities Index
http://galaxy.einet.net/galaxy/community/world-communities.html

World History Gateway
http://neal.ctstateu.edu:80/history/world_history/archives/archives.html

World Lecture Hall (university class materials)
http://wwwhost.cc.utexas.edu/world/instruction/index.html

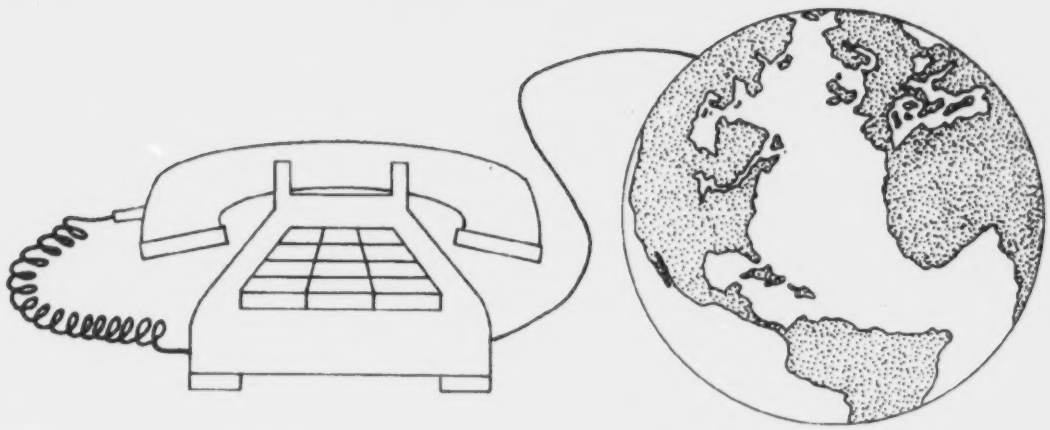
World School for Adventure Learning's "DeweyWeb" (K-12)
http://ics.soe.umich.edu/

W3 Servers (master list: registered servers)
http://www.w3.org/hypertext/datasources/www/servers.html

WWW Developers' Pages (HTML techniques, etc.)
http://oneworld.wa.com/htmldev/devpage/dev-page.html
http://www.nas.nasa.gov/rnr/education/weavers.html

The Zipper: Zipcode to Congressional Representative Matcher
http://www.stardot.com/~lukeseem/zip.html

ZooNet
http://www.mindspring.com/~zoonet



Appendix 3
Recommended Telnet Sites

Technical Note: When asked to select a terminal type at any of these sites, choose VT100 or VT102.

Name: American Type Culture Collection
Internet Address: **atcc.nih.gov**
156.40.144.248
Brief Description: Biology-related natural language database
Notes: Login as **search**. Use the password **common**.
Request help when logging in to see commands available.
Exit: Press the <Esc> (Escape) key, then any other key.

Name: Big Sky Network Remote Access
Internet Address: **bigsky.bigsky.dillon.mt.us**
192.231.192.1
Brief Description: K-12 resources, including lesson plans and education-oriented discussion groups.
Notes: Login as **bbs**.
Online registration is required to access free services; a fee of $50 per individual per year is necessary to access all services.

Name: BUBL: The Bulletin Board for Libraries
Internet Address: **niss.ac.uk**
193.63.76.1
Brief Description: BUBL aims to provide network-using librarians with information on services and resources on JANET and other networks (e.g., the Internet).
Notes: Select BUBL by typing **T** at the NISS Gateway Main Menu.
Exit: Type: **quit**

Name: Buffalo Freenet
Internet Address: **freenet.buffalo.edu**
128.205.200.12
Brief Description: A Freenet centered in Buffalo, New York.
Notes: Login as **freeport**.
Exit: Type: **x**

Name: CapAccess: National Capital Area Freenet
Internet Address: **cap.gwu.edu**
198.69.201.50
Brief Description: A Freenet centered in Washington, D.C.
Notes: Login sequence:

When you see...	Type...
login:	**guest**
Password:	**visitor**

Exit: Type: **x**

Name: CENET: Cornell Extension Network
Internet Address: **empire.cce.cornell.edu**
132.236.89.2
Brief Description: Agricultural and environmental information:

1. AGriculture	Agricultural production and management
2. CCE	Cornell Cooperative Extension Information
3. CENET-help	CENET accounts, almanac resources, settings and help
4. COMmunity	Community education and resources
5. FIELD-crops	Field crops and agronomy
6. FOOD	Food and nutrition
7. FRUIT-vegetable	Fruit and vegetable production and management
8. GLOBal	Global awareness
9. HUMAN-ecology	College of Human Ecology resources
10. NATural-resources	Forestry, wildlife, and marine science
11. NEWS	News bulletins, news releases and media information

12. ORNamentals	Ornamental horticulture, floriculture, home/grounds
13. PEST-management	Integrated pest management and pesticide information
14. WEAther	Weather information and forecasts
15. YOUth	Youth programming resources
16. FEEDback	Leave feedback for CENET staff

Notes: Login as **guest**
Exit: Type: **bye**

Name: CHAT
Internet Address: **debra.dgbt.doc.ca 3000**
142.92.36.15 3000
Brief Description: Natural language interaction to learn about subjects such as AIDS. Interactions are recorded by the developers for use in research. Comments are solicited at the end of each session.
There are information files available on the following topics:

- AIDS (Acquired Immune Deficiency Syndrome)
- Epilepsy
- the Canadian Department of Communications (DOC)
- Sex Education
- Alice (A simulated conversation)
- Maur (A simulated conversation with a dragon)

Notes: Login as **chat**
Exit: Type: **goodbye**

Name: Cleveland Freenet
Internet Address: **freenet-in-a.cwru.edu**
freenet-in-b.cwru.edu
freenet-in-c.cwru.edu
129.22.8.32
129.22.8.51
Brief Description: The "flagship" of the National Public Telecomputing Network, which provides free, unlimited, and easy access to information of many different types, organized for general community use.
Notes: Automatic login. See especially Academy One, dedicated to use by teachers and students in primary and secondary schools.
Exit: Type: **x**

Name: Dartmouth College Library Online System
Internet Address: **lib.dartmouth.edu**
129.170.16.11
Brief Description: An impressive collection of online services, including the World Factbook, the MLA Bibliography, full texts of 33 Shakespeare plays

and many sonnets, the King James version of the Bible, a portion of the MEDLINE database, and much more.

Notes: No login sequence is required. Type **select file** for a complete listing of services available, then follow screen prompts.

Exit: Type: **bye**

Name: Denver Freenet

Internet Address: **freenet.hsc.colorado.edu**
140.226.1.8

Brief Description: A freenet centered in Denver, Colorado.

Notes: Login as **guest**. If prompted for a password, use **guest**.

Exit: Type: **x**

Name: Diversity University MOO (MUD, Object-Oriented)

Internet Address: **moo.du.org 8888**
192.101.98.5 8888

Brief Description: "Diversity University MOO campuses are Internet locations for serious experimentation in network-based, interactive teaching, learning, and social services. Those wishing to further this community development are welcome!"

Notes: Login is automatic; type **co guest** to look around.

Exit: Type: **@quit**

Name: ECHO

Internet Address: **echo.lu**
158.64.1.51

Brief Description: European Commission Host Organization's menu of freely accessible databases:

1+: General information
2 : User guidance databases (incl. I'M GUIDE, I'M FORUM)
3 : Scientific and R & D databases
4 : COmmunity R & D Information Service (CORDIS)
5 : Databases or services in the language industry
6 : Databases or services in business and economy (incl. TED)
7 : Innovative projects
8 : Electronic mailbox
9 : Online registration to obtain a personal password

Notes: Login as **echo**

Exit: Type: **90** ("Other commands") and choose the **quit** option

Name: Economic Bulletin Board of the U.S. Department of Commerce
Internet Address: **ebb.stat-usa.gov**
192.239.70.17
Brief Description: Interest rates, foreign exchange rates, price indices, statistics, etc.
Notes: Supply the User ID of **guest**.
Exit: Type: **g** at the Main Menu

Name: Eisenhower National Clearinghouse for Mathematics and Science Education
Internet Address: **enc.org**
128.146.252.52
Brief Description: "The Eisenhower National Clearinghouse for Mathematics and Science Education at the Ohio State University, funded by the Department of Education, now has available a new online information service for science and mathematics education. Its first database, the ENC Catalog of Curriculum Resources describes a comprehensive, multimedia collection of materials and programs for K-12 mathematics and science education. Catalog records for these materials are designed to assist teachers in selecting appropriate and high quality items for classroom use. Additionally, ENC is creating a Digital Curriculum Laboratory (DCL), which provides access to a special collection of science and mathematics resources found on the Internet. Topics include: curriculum materials, standards, assessment, reform, professional development, and many others. Software, graphics, and text files, including ENC publications, can be found and downloaded. Available soon will be the ENC Database of Federal Programs where users will be able to find information about Federal resources available for mathematics and science education."
Notes: Login as **guest**. Register the first time that you visit, and a username will be assigned to you.
Exit: Choose **5** from Main Menu

Name: Environmental Protection Agency (EPA) Library
Internet Address: **epaibm.rtpnc.epa.gov**
134.67.180.1
Brief Description: A catalog to the holdings of the EPA's national library, with document abstracts.
Notes: Select **4** (Public), then **1** to use the service
Exit: Type: **Q**

Name: EnviroNET—The Space Science Information Service
Internet Address: **envnet.gsfc.nasa.gov**
128.183.104.16
Brief Description: "Provides access to a database containing information about natural and induced space environments, the full text of a handbook of spacecraft environmental anomalies and more."
Notes: Login as **envnet**. Use the password **henniker**.

Name: Eureka Database Service
Internet Address: **eureka-info.stanford.edu**
36.26.0.172
Brief Description: Search service using the resources of the Research Libraries Group. "Eureka is a new service that streamlines searching of RLG's online resources. It gives users straightforward access to a wide array of online information, including the RLIN bibliographic database of library, archives, and museum library holdings and the CitaDel article-citation and document-delivery service. And Eureka can be integrated into local library and campuswide information networks." A different database is demonstrated each week.
Notes: Login is automatic
Exit: Type: **quit**

Name: EX-USSR
Internet Address: **ukanaix.cc.ukans.edu**
129.237.33.1
Brief Description: "EX-USSR is a compendium of various data files with updated information about the 15 republics of the former Soviet Union. This list can grow as well as stay up-to-date only if readers contribute suggestions, comments, and corrections. New files will be added as new information is received. New files should include mail, phone numbers, and FAX numbers for officials and institutions in the various files."
Notes: Login as **ex-ussr**
Exit: Type: **q**

Name: FDA Electronic Bulletin Board
Internet Address: **fdabbs.fda.gov**
192.73.61.21
Brief Description: Lynx-accessible resource containing information on the Food and Drug Administration: its actions, congressional testimony, news releases, consumer information, AIDS, and veterinary medicine (Krol, 1992, p. 301).

Notes: Login as **bbs**. Use the password **bbs**.
Exit: Exit from main menu

Name: FEDIX
Internet Address: **fedix.fie.com**
192.111.228.33
Brief Description: "FEDIX is an online information service that links the higher education community and the federal government to facilitate research, education, and services. The system provides accurate and timely federal agency information to colleges, universities, and other research organizations."
In September 1995, FEDIX's main menu showed:
[1] FEDIX—Federal Agency Opportunities.
[2] MOLIS—Minority Online Information Service
[3] NCURA—National Council of University Research Administrators
[4] SRA—Society of Research Administrators
[5] EM BBS—Environmental Management Information
Exit: Type: **q**

Name: FedWorld
Internet Address: **fedworld.gov**
192.239.92.3
Brief Description: "Each year, the U.S. federal government spends more than $70 billion on scientific and technical research. The National Technical Information Service (NTIS) is tasked by Congress to help disseminate the vast amount of scientific and technical information along with other, nontechnical information. As a central point of connectivity, NTIS FedWorld offers access to thousands of files across a wide range of subject areas. You can find information ranging from Environmental Protection to Small Business. If you are interested in any of the thousands of NTIS products, download the NTIS Products and Services Catalog—*P&SCAT.TXT*, located in the NTIS Library of files.
FedWorld GateWay, a gateway connection to other Government systems worldwide. Multiple online databases, CALS, NTIS, MODIL, Patent, and more. All users have full-screen editing, Kermit protocol, Search & Retrieve, conference capabilities, and more. Once on FedWorld, it is possible to connect to more than 100 government-operated bulletin boards and online systems. Many, if not most, of these systems are not otherwise available via Internet."
Notes: No login is necessary. Users are required to register for a free user ID.
Exit: Exit at main menu

Name: Friends and Partners
Internet Address: **solar.rtd.utk.edu**
198.78.202.11
Brief Description: Russian and American news, weather, geography, and discussion.
Notes: Login as **friends**
Exit: Type: **Q**.

Name: Gabriel's Horn
Internet Address: **138.26.65.78 7777**
Brief Description: Automatically returns a randomly selected verse from either the New or Old Testament.
Notes: No login is necessary
Exit: Automatic disconnection as soon as the verse is printed

Name: GENII Laboratory School/Virtual Online University
Internet Address: **brazos.iac.net 8888**
198.180.60.147 8888
Brief Description: Text-based virtual university and online K-12 school and teacher training center.
Notes: Type **connect guest** after connecting. Type **helpme** for online help.
Exit: Follow instructions on screen

Name: Geographic Name Server
Internet Address: **141.212.100.9 3000**
Brief Description: Provides information about North American places by name, state/province, or zip code.
Notes: When the information is printed, it will be in this format:

0 <city name>
1 <county FIPS code> <county name>
2 <state/province abbreviation> <state/province name>
3 <nation abbreviation> <nation name>
A <telephone area code>
E <elevation in feet above mean sea level>
F <feature code> <feature name>
L <latitude DD MM SS X> <longitude DDD MM SS X>
P <1980 census population>
R <remark>
T <time zone>
Z <postal ("ZIP") code>

Exit: Type: **exit**

Name: Georgia College EduNet
Internet Address: **gcedunet.peachnet.edu**
168.16.205.59
Brief Description: A large collection of online resources for K-12 educators, including CNN Curriculum guides, a software evaluations library, Georgia's Quality Core Curriculum, a multimedia file exchange for Macintosh, Apple II, Apple IIGS, IBM, Amiga platforms, and more.
Notes: Login as **guest** and use **guest** as the password. You will be asked to register online.
Exit: Type: **L** at a menu screen

Name: Global Land Information System (GLIS)
Internet Address: **glis.cr.usgs.gov**
152.61.128.7
Brief Description: The Global Land Information System (GLIS) provides a centralized, interactive source of land data sets for use in continental-scale earth science research and global change studies. GLIS includes directory-, user guide-, and inventory-level information about data sets residing both at the EROS Data Center and elsewhere. Display of geographic coverage maps and raster browse images are available to GLIS users accessing the system utilizing a PC.
Notes: Login as **guest**
Exit: Follow directions on screen

Name: Ham Radio Callbook
Internet Address: **callsign.cs.buffalo.edu 2000**
128.205.32.2 2000
Brief Description: National ham radio call-sign callbook.
Notes: No login needed
Available commands:

call [filters] callsign	- lookup callsign
city [filters] city	- lookup city
help [command]	- get help on command
info	- get information about server
more rows	- set number of terminal rows
name [filters] surname	- lookup last name
quit	- exit the server
set name|data|raw|addr	- set the display mode
zip [filters] zipcode	- lookup zip code

Exit: Type: **quit** at the >> prompt

Name: Health Sciences Libraries Consortium CBL Software Database
Internet Address: **shrsys.hslc.org**
192.100.94.3
Brief Description: "The Health Sciences Libraries Consortium (HSLC) Computer Based Learning Software Database, begun in 1987, contains listings of PC-compatible and Macintosh programs used in health-sciences education. This project has been endorsed, and funded, by the American Medical Informatics Association's Education Working Group. Records have also been contributed by the University of Michigan's Software for Health Sciences Education (supported by a grant from Sandoz Pharmaceuticals)."
Notes: Login as **CBL**
Exit: Type: **sto**

Name: HNSOURCE: The Central Information Server for Historians
Internet Address: **ukanaix.cc.ukans.edu**
129.237.33.1
Brief Description: Lynx access to a large compendium of historical resources on the Internet.
Notes: Login as **history**
Exit: Type: **q**

Name: HP Calculator BBS
Internet Address: **hpcvbbs.cv.hp.com**
192.170.7.13
Brief Description: BBS for Hewlett-Packard calculator users. Has chat facilities and conferences.
Notes: Login as **lynx**
Exit: Type: **q**

Name: Institute of Historical Research Information Server
Internet Address: **clus1.ulcc.ac.uk**
192.12.72.60
Brief Description: Many online historical resources, including informational databases, discussion groups, directories, and Internet tools.

° I N S T I T U T E O F H I S T O R I C A L R E S E A R C H °

° What is IHR-INFO [press return and read]
° Centre for Metropolitan History (CMH)
° Electronic News, Directories, Conferences, and Seminars
° Institute Bulletin Board

243

° Internet Navigation Tools
° Online Resources for Historians in London
° Online Resources for Historians in the U.K.
° Online Resources for Historians World-Wide
° Index and Glossary of terms [also type 'i' on any menu]
° Victoria County History (VCH)
° Virtual Library—Subject Tree for all Disciplines
° Exhibition 'History of Historical Research'

Notes: Login sequence:

When you see...	Type...
login:	**ihr-uk**
password:	**ihr-uk**

Exit: Type: **q**

Name: International Education Bulletin Board
Internet Address: **nis.calstate.edu**
130.150.100.60
Brief Description: The International Education Bulletin Board was established at the suggestion of many faculty and administrators who are associated with international education. The availability of program listings, resources, contact individuals, and governmental information will enable campuses to have information "at their fingertips."
Notes: Login as **intl**
Exit: Type: **q** at main menu

Name: InterNIC Directory and Database Services
Internet Address: **ds.internic.net**
198.49.45.10
Brief Description: Internet user directory (X.500), directory of Internet directories, InterNIC document lookup services (by name or keyword): InterNIC Directory and Database Services (DS) Telnet Application.

Main Menu

1) User Tutorial
2) InterNIC Directory of Directories
3) InterNIC Directory Services ("White Pages")
4) Search the InterNIC DS Server File Space
5) Browse the InterNIC DS Server File Space (GOPHER)
6) Internet Public File Search (ARCHIE)
7) Internet Documentation (RFC's, FYI's, etc.) Search
8) End Application (or 'q', 'e', 'quit', or 'exit')

Notes: Login as **guest**
Exit: Type: **6** at main menu

Name: IPAC Extragalactic Database
Internet Address: **ned.ipac.caltech.edu**
134.4.10.119
Brief Description: Extensive information on 132,000 extragalactic objects (galaxies, quasars, infrared, and radio sources) and software to search raw data and associated bibliographies.
Notes: Login as **ned**
Exit: Hold down the <Control> key, then type **x**. Repeat once.

Name: Knowbot Information Server
Internet Address: **info.cnri.reston.va.us 185**
132.151.1.15 185
Brief Description: Retrieves user IDs, e-mail addresses, postal addresses, telephone numbers, and institutional affiliations for users throughout the Internet.
Notes: No login needed. Type **help** for a list of commands.
Exit: Type: **quit** or **exit**

Name: LawNet (Columbia University)
Internet Address: **lawnet.law.columbia.edu**
128.59.176.83
Brief Description: Legal and judicial information.
Notes: Login as **lawnet**. Main menu selections are:

CU-LawNet Info System

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1. Law Library Catalog PEGASUS
2. University Catalog CLIO
3. Project JANUS experimental textual search interface
4. Law School Academic Services
5. Law School Career Services
6. ColumbiaNet
7. Advanced World wide library access (HytelNet)

h Help message

Exit: Type: **Q** twice.

Name: LC Marvel
Internet Address: **marvel.loc.gov**
140.147.248.7
Brief Description: Offers access to information from and about the Library of Congress, the U.S. federal government, copyright, and assorted Internet

services. The main menu of LC MARVEL consists of the following selections:

1. About LC MARVEL (Please Read First)/
2. Library of Congress: Facilities, Activities, and Services/
3. Research and Reference/
4. Library of Congress Online Systems/
5. The U.S. Congress/
6. Federal Government Information/
7. Services to Libraries and Publishers/
8. Copyright/
9. Emplovee Information/
10. The Global Electronic Library (by Subject)/
11. Internet Resources/
12. What's New on LC MARVEL/
13. Search LC MARVEL Menus/

Notes: Login as **marvel**
Exit: Type: **q**

Name: Liberty Law Library
Internet Address: **liberty.uc.wlu.edu**
137.113.192.101
Brief Description: Offers access to law libraries for legal research and copies of laws for each state, national computer-related laws, and so on. Also serves as a gateway to many other interactive services.
Notes: Login as **lawlib** and use **lawlib** as the password.
Exit: Type: **q** to quit

Name: LIBS
Internet Address: **ubvmsb.cc.buffalo.edu**
128.205.100.3
Brief Description: Menu-driven utility that allows easy access to a large number of U.S. and foreign university libraries.
Notes: Login as **LIBS**

"Press CLEAR" means: Hold down the <Control> key, and press the **Z** key. This program allows you to access a wide range of information resources at many different institutions. Because the systems all use different software packages, and run on different computers, you need to know something about each system to use it. This vital information is provided immediately before you connect to each system. If you are unfamiliar with a system, it is very important that you write down these special instructions before connecting to the system. In many cases, the screen will clear as soon as you connect, so you should not count on having the instructions visible after you connect.

Exit: Hold down the <Control> key, and press the **C** key. Then, if necessary, press the **Q** key, then press the <Return> key.

Name: LOCIS: Library of Congress Information System
Internet Address: **locis.loc.gov**
140.147.254.3
Brief Description: LOCIS includes more than 15 million catalog records and more than 10 million records for other types of information: federal legislation, copyright registrations, Braille and audio, organizations, and selected foreign legal materials.
Notes: No login necessary
Searching hours are (all times USA eastern; closed on national holidays):
Monday–Friday: 6:30am–9:30pm
Saturday: 8:00am–5:00pm
Sunday: 1:00pm–5:00pm
Exit: Choose: number **12** repeatedly from successive menus.

Name: Martin Luther King Jr. Bibliography
Internet Address: **forsythetn.stanford.edu**
36.172.0.41
Brief Description: The MLK Bibliography lists approximately 2,700 bibliographic citations to works by or about Martin Luther King, Jr., and the civil rights movement. This bibliography was compiled by staff of the Martin Luther King, Jr. Papers Project, as a first step in preparing to publish King's works. It is intended to help both the student and the scholar traverse the rich and varied terrain of primary and secondary historical, sociological, and journalistic sources on King and the Black freedom struggle.
Notes: Login sequence:

When you see…	Type…
Account?	**socrates**
OK to proceed?	**yes**
Type of terminal?	**VT100**
Your Response	**select mlk**

Exit: Type: **END**

Name: MicroMuse
Internet Address: **michael.ai.mit.edu**
192.1.100.42
Brief Description: Virtual community that supports realtime conversations in a text-based microworld (virtual reality). Participants can explore this twenty-fourth-century science fiction environment, communicate with each other, or design their own space in the microworld.
Notes: Login as **guest**. When you see the main screen, type **connect visitor** *your_first_name*.
Online help:
To get a list of MicroMuse commands, type:
help commands

To get help with a specific command, type:
help *command* (Example: **help whisper**)
To get a list of MicroMuse topics, type:
help topics
Exit: Type: **QUIT**

Name: Milwaukee Omnifest
Internet Address: **129.89.70.58**
Brief Description: A Freenet centered in Milwaukee, Wisconsin.
Notes: Login as **visitor**
Exit: Type: **q**

Name: Music and Behavior Database
Internet Address: **mila.ps.uci.edu**
128.200.29.81
Brief Description: Easy-to-use database of information related to the study of the effects of music on behavior.
Notes: Login as **mbi**. Use the password **nammbi**.
Exit: Choose **5** from the main menu

Name: National Capitol Freenet
Internet Address: **freenet.carleton.ca**
134.117.1.25
Brief Description: A Freenet centered in Ottawa, Canada.
Notes: Login as **guest**
Exit: Type: **x**

Name: National Distance Learning Center
Internet Address: **128.163.193.10**
Brief Description: Huge database for educators in search of educational materials, such as films, print, videodisc, and satellite broadcasts. You can search by subject, media, and audience. Each product in the database has a description and contact information. There are also sections for adult education and college courses (online).
Notes: Login as **ndlc**
Exit: Exit at main menu

Name: Netfind User Lookup
Internet Address: **bruno.cs.colorado.edu**
128.138.243.150

Brief Description: Finds a user (given name and organization/institution).
Notes: Login as **netfind**
This is a useful service, but requires practice.
Exit: Go to main menu and choose: **Quit**

Name: NICOL (JvNCnet Gopher Server)
Internet Address: **nicol.jvnc.net**
128.121.50.2
Brief Description: "This server provides linkages to some of the best sources of Internet network information available via WAIS, WWW, anonymous FTP, and Gopher, thus, presenting the data in a seamless and orderly manner."
Notes: Login as **nicol**
Exit: Type: **q**

Name: Paradise Directory
Internet Address: **hypatia.umdc.umu.se**
130.239.16.132
Brief Description: "This online directory service helps you to find out information about people and the organizations they work for. In particular it can provide electronic mail addresses, postal addresses, and telephone and facsimile numbers. Once you have provided information about a person's NAME and where they are based, the directory service will search various local and remote databases to try and find information about people with a name matching the one you have given. The directory service can, of course, only find entries for people who work for organizations who are participating in this pilot service. "
Notes: Login as **de**
Exit: Type: **q**

Name: PENPages & TeacherPages
Internet Address: **psupen.psu.edu**
128.118.36.4
Brief Description: Contains online articles and brochures with information helpful to teachers, agriculture, careers, health, consumer issues, weather, and Penn State University.
Notes: Login with the two-letter abbreviation for your state, or **WORLD** if you live outside the United States.
Exit: Follow instructions printed on the screen

Name: Periodic Table of the Elements
Internet Address: **131.174.82.239 2034**
Brief Description: Electronic periodic table and associated information:
Commands: {key} - {action}

a. Abbreviations Table
b. Basic Metric Units
c. Properties of Metals as Conductors
d. Documentation/Reference Text
e. Periodic Table (Newlands, 1865)
f. Periodic Table (Medeleev, 1872)
g. Draw Group Labels
h. Move left
i. Information on specific element
j. Move down
k. Move up
l. Move right
m. Metrix Prefixes
n. Numbered Table
o. (future implement.)
p. Redraw Symbols Table
q. (future implement.)
r. Radii, Ionic w states
s. Show element groups
t. (future implement.)
u. Show e- config. on PT
v. Visual Enhancement
w. (future implement.)
x. Exit/Quit

Notes: Login is automatic
Exit: Type: **x**

Name: Privacy Rights Clearinghouse BBS
Internet Address: **teetot.acusd.edu**
192.55.87.19
Brief Description: This BBS provides up-to-date information regarding privacy-related issues in telecommunications and is administered by the University of San Diego Center for Public Interest Law.
Notes: Login as **privacy**
Exit: Type: **q**

Name: Rio Grande Freenet
Internet Address: **rgfn.epcc.edu**
206.42.175.2
Brief Description: A Freenet centered in the Rio Grande Valley in Texas. Items are displayed in both Spanish and English.
Notes: Login as **visitor**
Exit: Type: **x**

Name: Rutgers CWIS
Internet Address: **info.rutgers.edu**
128.6.4.7

Brief Description: University Campus-Wide Information System, which offers an online dictionary, thesaurus, the CIA World Fact Book, and a quotations database.

Notes: Login is automatic. Some services are restricted for use by Rutgers students and faculty only.

Exit: Type: **q**

Name: SENDIT K-12 Educational Telecommunication Network
Internet Address: **sendit.nodak.edu**
134.129.105.6

Brief Description: Internet-accessible BBS that provides many useful resources for K-12 teachers and students:

1. K12NET EDUCATIONAL FORUMS
2. NODAK FORUMS
3. KIDLINK
4. ELECTRONIC CLASSROOM
5. LIBRARY RESOURCES
6. FEDERAL GOVERNMENT RESOURCES
7. OTHER SYSTEMS/NETWORKS
8. User Services, System Statistics
9. SENDIT Users Directory
10. Help Desk
11. New Resources Available

Notes: Login sequence:

When you see...	Type...
login:	**bbs**
Password:	**sendit2me**

Exit: Type: **x**

Name: Spacelink
Internet Address: **128.158.13.250**

Brief Description: Database and interactive system containing information about NASA and NASA activities. Includes a large number of possible curricular activities for elementary and secondary science classes. A *very* busy site.

Notes: Login sequence:

When you see...	Type...
Username:	**newuser**
Password:	**newuser**

WARNING: This is a *very* busy site. It is often difficult to access.

Exit: Select: **EXIT** from main menu

Name: SpaceMet Internet
Internet Address: **spacemet.phast.umass.edu**
128.119.50.48 251

Brief Description: SpaceMet Internet is open to everyone interested in space, science, teaching, and related subjects. There is no charge for using this service, although contributions are welcomed. It has a "message area" and a "files area."
Notes: Full online registration is required during the first session.
Exit: Type: **Q**, then **G**, then **Y**, then **n** to quit

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Name: Sports Schedules
Internet Address:
NBA: **culine.colorado.edu 859**
128.138.129.170 859
NHL: **culine.colorado.edu 860**
128.138.129.170 860
MLB: **culine.colorado.edu 862**
128.138.129.170 862
NFL: **culine.colorado.edu 863**
128.138.129.170 863
Brief Description: Offers sports schedules online.
Notes: Login is automatic. Type: **help** for system assistance.
Exit: Type: **exit**

Name: STInfo
Internet Address: **stinfo.hq.eso.org**
134.171.40.8
Brief Description: Offers current status reports, European news about, and press releases on the Hubble telescope.
Notes: Login as **stinfo**
Exit: Type: **q**

Name: STIS (Science and Technology Information System)
Internet Address: **stis.nsf.gov**
128.150.195.83
Brief Description: "The National Science Foundation (NSF) has established STIS as an electronic dissemination system that provides electronic access to NSF publications. STIS allows the user to search the full text of a publication and to obtain a copy electronically."
Notes: Login as **new**
Exit: Press the <Esc> key

Name: Subway Navigator
Internet Address: **metro.jussieu.fr 10000**
134.157.0.132 10000
Brief Description: Search subway routes in major cities, in French or English.
Notes: No login necessary.

Name: Supercomputer Modeling Resources
Internet Address: **nebbs.nersc.gov**
128.55.128.90
Brief Description: Resources that help teachers and students to use supercomputer-based modeling programs. Excellent for science explorations. Sometimes difficult to make a connection here.
Notes: Login as **nebbs**

Name: Tallahassee Freenet
Internet Address: **freenet.fsu.edu**
144.174.128.43
Brief Description: A Freenet centered in Tallahassee, Florida.
Notes: Login as **visitor**
Exit: Type: **x**

Name: Time (exact)
Internet Address: **india.colorado.edu 13**
128.138.140.44
Brief Description: Returns the exact time in Colorado, then automatically closes the connection. Time reported is read from a nuclear clock, which is the most precise clock in the world.
Notes: No login necessary.

Name: UnCover
Internet Address: **database.carl.org**
192.54.81.76
Brief Description: "UnCover is a database of current article information taken from 15,000 multidisciplinary journals. UnCover contains brief descriptive information about over 4,000,000 articles, which have appeared since Fall 1988. UnCover is easy to use, with keyword access to article titles and summaries. You can also "re-create" the tables of contents pages from journals of particular interest to you. UnCover2 allows articles to be sent directly to your FAX machine."

Notes: Login is automatic when you **telnet** in. Choose option number **5** for terminal type (VT100).
Exit: Type: **//EXIT**

Name: UMD Information Database
Internet Address: **info.umd.edu**
128.8.10.29
Brief Description: Facilitates access to many different informational documents, including a database of Supreme Court decisions.
Notes: Login is automatic
Exit: Type: **q**

Name: U.S. Environmental Protection Agency BBS
Internet Address: **ttnbbs.rtpnc.epa.gov**
134.67.234.17
Brief Description: Well-organized collection of information about pollution.
Notes: Login is automatic. Selection of password is required for first visit.

Name: University of Massachusetts/Amherst K-12 Information System
Internet Address: **k12.ucs.umass.edu**
128.119.166.2
Brief Description: Offers a variety of K-12-oriented networked services, including discussion groups, bulletins, local resources, and access to assorted Internet services.
Notes: Login as **guest**
Exit: Type: **x**

Name: University of North Carolina's Internet Extended Bulletin Board Service
Internet Address: **bbs.oit.unc.edu**
152.2.22.80
Brief Description: Offers access to many online information systems, including experimental Gophers.
Notes: Login as **bbs**
Exit: Type: **q**

Name: University of Virginia Grounds-Wide Information Server
Internet Address: **gopher.virginia.edu**
128.143.22.36
Brief Description: Links to Internet resources and information on UVa.
Notes: Login as **gwis**
Exit: Type: **q**

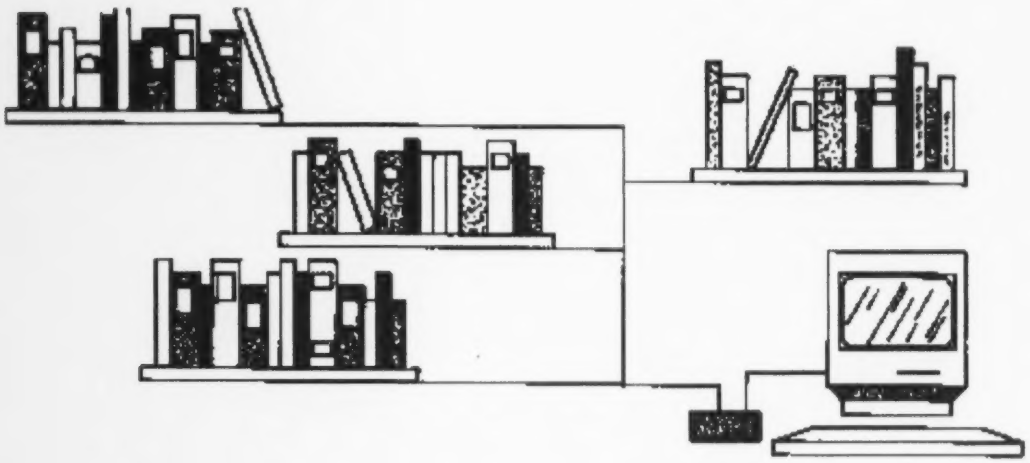
Name: Victoria Freenet
Internet Address: **freenet.victoria.bc.ca**
199.60.222.1
Brief Description: A Freenet centered in Victoria, British Columbia, Canada.
Notes: Login as **guest**
Exit: Type: **x**

Name: Weather Underground
Internet Address: **madlab.sprl.umich.edu 3000**
141.213.23.12 3000
Brief Description: Complete online U.S. Weather Service for regions and cities.
Notes: Login is automatic. This site is menu-driven and well prompted.
Exit: Select **X** from the main menu

Name: World Paleomagnetic Database
Internet Address: **earth.eps.pitt.edu**
136.142.122.26
Brief Description: Searchable database of paleomagnetic information, organized by longitude and latitude.
Notes: Login as **Search** (the login code is case-sensitive)
Exit: Type: **quit**

Name: WorldWindow (Washington University Libraries)
Internet Address: **library.wustl.edu**
128.252.173.4
Brief Description: Offers access to a large number of Internet services, including online libraries, NASA databases, the STIS system, CompuServe access, weather forecasts, and realtime chess games.
Notes: Press the <Return> key to bypass username and password.
Exit: Type: **q** to quit

Name: Youngstown Freenet
Internet Address: **yfn2.ysu.edu**
192.55.234.50
Brief Description: A Freenet centered in Youngstown, Ohio.
Notes: Login as **visitor**
Exit: Type: **x**



Appendix 4
Recommended FTP Archives

Name: Apple, Inc. Archive
Internet Address: **ftp.apple.com**
Brief Description: Software, documentation, and updates for Apple computers.
Notes: Login as **anonymous** and use your Internet address as a password.

Name: Bell Telephone Archive
Internet Address: **bell.com**
Subdirectory Path: **cd pub**
Brief Description: Many documents in a well-organized archive. Subdirectory topics include consumer issues, education, general telecommunications, jobs, legislation, telecommunications studies, and telemedicine.
Notes: Login as **anonymous** and use your Internet address as a password.

Name: Berkeley Archive
Internet Address: **ocf.berkeley.edu**
128.32.184.254
Subdirectory Path: **cd pub**

Brief Description: Many text documents, including the Bible, song lyrics, poetry, Shakespeare, and more.
Notes: Login as **anonymous** and use your Internet address as a password.

Name: Big Sky Telegraph Archive
Internet Address: **bigsky.bigsky.dillon.mt.us**
Brief Description: Many resources for K-12 education, including lesson plans.
Notes: Login as **anonymous** and use your Internet address as a password.

Name: Center for Innovative Computer Applications (CICA) Archive
Internet Address: **ftp.cica.indiana.edu**
129.79.20.42
Subdirectory Path: **cd pub/pc**
Brief Description: Clearinghouse for Microsoft *Windows* applications, utilities, drivers, tips, bitmaps, etc.
Notes: Login as **anonymous** and use your Internet address as a password.

Name: Clearinghouse for Subject-Oriented Internet Resource Guides
Internet Address: **una.hh.lib.umich.edu**
Subdirectory Path: **cd inetdirsstacks**
Brief Description: Collection of Internet resources guides in specific subject areas.
Notes: Login as **anonymous** and use your Internet address as a password.

Name: Cornell University Video Archive
Internet Address: **gated.cornell.edu**
Subdirectory Path: **cd pub/cu-seeme**
Brief Description: CU-SeeMe two-way interactive video software and documentation.
Notes: Login as **anonymous** and use your Internet address as a password.

Name: December's Archive
Internet Address: **ftp.rpi.edu**
Subdirectory Path: **cd pub/communications**
Brief Description: Good collection of documents that can assist Internet exploration.
Notes: Login as **anonymous** and use your Internet address as a password.

Name: EdNet Archive
Internet Address: **nic.umass.edu**
Subdirectory Path: **cd pub/ednet**
Brief Description: Files that list listservs and Usenet newsgroups that relate to education: *educatrs.lst* & *edusenet.gde*.
Notes: Login as **anonymous** and use your Internet address as a password.

Name: The Electronic Journal of Virtual Culture
Internet Address: **byrd.mu.wvnet.edu**
Subdirectory Path: **cd pub/ejvc**
Brief Description: Archive of articles published electronically in the refereed *Electronic Journal of Virtual Culture*.
Notes: Login as **anonymous** and use your Internet address as a password.

Name: FAQs (Frequently Asked Questions)
Internet Address: **rtfm.mit.edu**
18.70.0.226
Subdirectory Path: **cd pub/usenet/news.answers**
Brief Description: "Even if you don't have direct access to Usenet, you might find the collection of FAQs in the *news.answers* archive of interest. The FAQs are updated regularly and cover a wide range of topics. They are useful pointers to not only electronic resources, but also a fairly reliable source of answers that have been tested by real users. Start by getting a copy of the *ftplist* and the *Usenet-faq* or *primer* via anonymous FTP."
Notes: Login as **anonymous** and use your Internet address as a password.

Name: Garbo Archive
Internet Address: **garbo.uwasa.fi**
Subdirectory Path: **cd mac** (for Macintosh software)
cd pc (for MS-DOS software)
cd windows (for MS-DOS machines with *Windows*)
cd WWW (Web tools, icons, etc.)
Brief Description: *Much* software, plus some graphics.
Notes: Login as **anonymous** and use your Internet address as a password.

Name: Handicap News Archives
Internet Address: **handicap.shel.isc-br.com**
handicap.afd.olivetti.com
Subdirectory Path: **cd pub**

Brief Description: Many files that address many types of disabilities. Software (freeware, shareware, and demonstration programs) is included.
Notes: Login as **anonymous** and use your Internet address as a password.

Name: Internet Training Archive
Internet Address: **nstn.ns.ca**
Subdirectory Path: **cd pub/doc**
cd pub/mac-stuff
cd pub/pc-stuff
Brief Description: This site provides information that would be helpful to anyone wishing to teach others how to access and use the Internet, plus software for telecommunications for Macintosh, MS-DOS (including *Windows*), and Unix.
Notes: Login as **anonymous** and use your Internet address as a password.

Name: InterNIC Archive
Internet Address: **ftp.sura.net**
Subdirectory Path: **cd pub**
Brief Description: Much Internet "how-to" information, especially for new Internet users.
Notes: Login as **anonymous** and use your Internet address as a password.

Name: KYBER-12 Archive
Internet Address: **byrd.mu.wvnet.edu**
Subdirectory Path: **cd pub/estepp/kyber-12**
Brief Description: Archive of K-12 resources. Get the file *project.kyber-12* for a full description of the online project.
Notes: Login as **anonymous** and use your Internet address as a password.

Name: LIBSOFT (Library Software Archive)
Internet Address: **hydra.uwo.ca**
Brief Description: This site contains files intended to assist library/media specialists. It is *not* a Unix-based site, but the **dir** and **get** commands will work.
Notes: Login as **anonymous** and use your Internet address as a password.

Name: Logo Archive
Internet Address: **cherupakha.media.mit.edu**
Subdirectory Path: **cd pub/logo**

Brief Description: Archive of public domain Logo software, discussions, newsletters, sample programs, and so on.
Notes: Login as **anonymous** and use your Internet address as a password.

Name: Lyric and Discography Archive
Internet Address: cs.uwp.edu
Subdirectory Path: cd pub/music
Brief Description: Archive of song lyrics and discographies of classical and popular artists; more than 225 discographies and more than 1,000 songs and albums represented.
Notes: Login as **anonymous** and use your Internet address as a password.

Name: Microsoft, Inc. Archive
Internet Address: ftp.microsoft.com
Brief Description: Large collection of software and documents that relate to Microsoft products.
Notes: Login as **anonymous** and use your Internet address as a password.

Name: NASA Archive
Internet Address: explorer.arc.nasa.gov
Subdirectory Path: cd pub/SPACE
Brief Description: The Ames NASA archives are a rich source of information and files about the space program. The large collection of *.gif* pictures contains images from the Voyager missions as well as the Space Shuttle. Software for viewing the pictures is also available for many kinds of desktop computers.
Notes: Login as **anonymous** and use your Internet address as a password.

Name: NCSA Archive
Internet Address: ftp.ncsa.uiuc.edu
Subdirectory Path: cd Education/Education_Resources
Brief Description: This archive contains documents that pertain to the educational use of telecomputing tools. *Mosaic*, *Mosaic* tool programs, and sample *Mosaic* pages are also available here.
Notes: Login as **anonymous** and use **guest** as a password.

Name: NSFNet Archive
Internet Address: nis.nsf.net

Brief Description: This site contains files that address NSFNet, the NREN, and other NSF initiatives to assist national telecomputing.
Notes: Login as **anonymous** and use **guest** as a password.

Name: Photographic Images Archive
Internet Address: **photo1.si.edu**
Subdirectory Path: **cd images/gif89a**
cd images/jpeg
Brief Description: GIF and JPEG format photographic images of people, places, air and space, art, science and nature, history, and technology.
Notes: Login as **anonymous** and use **guest** as a password.

Name: Project Gutenberg
Internet Address: **uiarchive.cso.uiuc.edu**
Subdirectory Path: **cd pub/etext/gutenberg**
Brief Description: Project Gutenberg is a not-for-profit organization whose goal is to prepare electronic editions of more than 10,000 books by the year 2001. All documents are available as text-only files, but many can be obtained in PostScript or troff formats.
Notes: Contains files of children's books, historical documents, religious texts, and poetry. Login as **anonymous** and use your Internet address as a password.

Name: Project Hermes
Internet Address: **ftp.cwru.edu**
Subdirectory Path: **cd hermes/ascii**
cd hermes/briefs
Brief Description: On May 11, 1990, the United States Supreme Court began Project Hermes as an experimental program. The objective of the project is to rapidly provide copies of the court's opinions in electronic form to as wide an audience as possible.
Notes: File name extensions are:

O for the opinion	S for the syllabus
C for concurring opinions	D for dissenting opinions

Login as **anonymous** and use your Internet address as a password.

Name: SchoolNet Archive
Internet Address: **schoolnet.carleton.ca**
Subdirectory Path: **cd pub**
Brief Description: Files and software concerning a national K-12 networking initiative. Files are available in both English and French.
Notes: Login as **anonymous** and use your Internet address as a password.

Name: Science Education Archive
Internet Address: **ftp.bio.indiana.edu**
Brief Description: This site contains files intended to assist science teachers.
Notes: Login as **anonymous** and use your Internet address as a password.

Name: Stanford Software Archive
Internet Address: **sumex-aim.stanford.edu**
Brief Description: Much software for all types of personal computers.
Notes: Login as **anonymous** and use your Internet address as a password.

Name: Sunsite Multimedia Archive
Internet Address: **sunsite.unc.edu**
Subdirectory Path: **cd pub/multimedia**
Brief Description: Pictures, sounds, music, animation, and utilities for multimedia projects.
Notes: Login as **anonymous** and use your Internet address as a password.

Name: Teacher Contacts Lists and Telecomputing Projects
Internet Address: **ftp.vt.edu**
Subdirectory Path: **cd pub/k12**
Brief Description: Periodically updated lists of K-12 teachers with Internet access, maintained by Sally Laughon.
Notes: Login as **anonymous** and use your Internet address as a password.

Name: Texas Center for Educational Technology (TCET) Archive
Internet Address: **tcet.unt.edu**
tapr.org
Subdirectory Path: **cd pub/telecomputing-info**
cd pub/ed-telecomputing
Brief Description: Archive of educational computing information, including the most recent version of the *Internet Resource Directory for Educators*.
Notes: Login as **anonymous** and use your Internet address as a password.

Name: Text Documents Archive
Internet Address: **ftp.uu.net**
Subdirectory Path: **cd doc/literary**

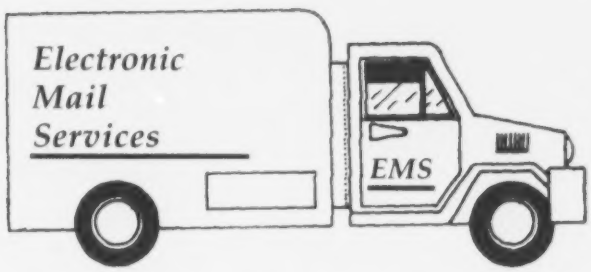
Brief Description: Large selection of historical and literary documents, including collections of Shakespeare's works and a mirror site for Project Gutenberg.
Notes: Login as **anonymous** and use your Internet address as a password.

Name: University of Michigan Software Archives
Internet Address: **archive.umich.edu**
mirror.archive.umich.edu
Brief Description: A huge collection of freeware and shareware for many types of computers.
Notes: Choose subdirectories according to the type of software desired. Login as **anonymous** and use your Internet address as a password.

Name: University of Minnesota's Minuet Archive
Internet Address: **minuet.micro.umn.edu**
Subdirectory Path: **cd pub/minuet/latest**
Brief Description: Programs and docs for this MS-DOS client-server suite of tools.
Notes: Login as **anonymous** and use your Internet address as a password.

Name: University of Texas—Austin Software Archive
Internet Address: **microlib.cc.utexas.edu**
Subdirectory Path: **cd microlib**
Brief Description: Large collection of software, graphics, sounds, etc., for many computer platforms.
Notes: Login as **anonymous** and use your Internet address as a password.

Name: Washington University Public Domain Archives
Internet Address: **wuarchive.wustl.edu**
Brief Description: A huge collection of freeware and shareware for many types of computers.
Notes: Choose subdirectories according to the type of software desired. Login as **anonymous** and use your Internet address as a password.



Appendix 5
Recommended Mailing Lists

Topic: Alternative Educational Environments
List's Name: AEE
Administrative Address: listserv@listserv.net
Participation Address: aee@miamiu.muohio.edu

Topic: American Educational Research Association List (AERA)
List's Name: AERA
Administrative Address: listserv@listserv.net
Participation Address: aera@asuvm.inre.asu.edu

Topic: AERA-A Division A: Educational Administration Forum
List's Name: AERA-A
Administrative Address: listserv@listserv.net
Participation Address: aera-a@asuvm.inre.asu.edu

Topic: AERA-G Division G: Social Context of Education
List's Name: AERA-G
Administrative Address: listserv@listserv.net
Participation Address: aera-g@asuvm.inre.asu.edu

Topic: AERA-H Division H: School Evaluation and Program Development
List's Name: AERA-H
Administrative Address: listserv@asuvm.inre.asu.edu
Participation Address: aera-h@asuvm.inre.asu.edu

Topic: AERA-K Division K: Teaching and Teacher Education
List's Name: AERA-K
Administrative Address: listserv@listserv.net
Participation Address: aera-k@asuvm.inre.asu.edu

Topic: K-12 Arts Education
List's Name: k12artsed
Administrative Address: listserv@kennedy-center.org
Participation Address: k12artsed@kennedy-center.org

Topic: Art Education Issues
List's Name: UAARTED
Administrative Address: listserv@listserv.net
Participation Address: uaarted@listserv.arizona.edu

Topic: Association for Experiential Education
List's Name: AEELIST
Administrative Address: listserv@listserv.net
Participation Address: aeelist@pucc.princeton.edu

Topic: Attention Deficit/Hyperactivity Disorder
List's Name: add-parents
Administrative Address: listserv@n7kbt.rain.com
Participation Address: add-parents@n7kbt.rain.com

Topic: Behavioral and Emotional Disorders in Children
List's Name: BEHAVIOR
Administrative Address: listserv@asuvm.inre.asu.edu
Participation Address: behavior@asuvm.inre.asu.edu

Topic: Biology Teacher Enhancement
List's Name: BIOPI-L
Administrative Address: listserv@ksuvm.ksu.edu
Participation Address: biopi-l@ksuvm.ksu.edu

Topic: Biotechnology Education
List's Name: VTBIOTEC
Administrative Address: listserv@listserv.net
Participation Address: vtbiotec@vtvm1.cc.vt.edu

Topic: Business Education Teaching Practices
List's Name: BUSED-L
Administrative Address: listserv@listserv.net
Participation Address: bused-l@max.cc.uregina.ca

Topic: Chemistry Education
List's Name: CHEMED-L
Administrative Address: listserv@listserv.net
Participation Address: chemed-l@uwf.cc.uwf.edu

Topic: Chemistry Telementoring
List's Name: chemistrytm
Administrative Address: chemistrytm-request@dhvx20.csudh.edu
Participation Address: chemistrytm@dhvx20.csudh.edu

Topic: Child Abuse
List's Name: ABUSE-L
Administrative Address: listserv@ubvm.cc.buffalo.edu
Participation Address: abuse-l@ubvm.cc.buffalo.edu

Topic: Child-Centered Learning
List's Name: learning
Administrative Address: learning-request@sea.east.sun.com
Participation Address: learning@sea.east.sun.com

Topic: Children Accessing Controversial Information Through Computer Networks
List's Name: CACI
Administrative Address: caci-request@media.mit.edu
Participation Address: caci@media.mit.edu

Topic: Children's Book Discussions
List's Name: BR_Cafe
Administrative Address: listproc@micronet.wcu.edu
Participation Address: br_cafe@micronet.wcu.edu

Topic: Children's Literature: Criticism and Theory
List's Name: CHILDLIT
Administrative Address: listserv@rutvm1.rutgers.edu
Participation Address: childlit@rutvm1.rutgers.edu

Topic: Children's Music
List's Name: CHILDMUS
Administrative Address: listserv@ricevm1.bitnet
Participation Address: childmus@ricevm1.bitnet

Topic: Children's Rights List
List's Name: Y-RIGHTS
Administrative Address: listserv@sjuvm.stjohns.edu
Participation Address: y-rights@sjuvm.stjohns.edu

Topic: Children With Special Health Care Needs
List's Name: CSHCN-L
Administrative Address: listserv@nervm.nerdc.ufl.edu
Participation Address: cshcn-l@nervm.nerdc.ufl.edu

Topic: Coalition of Essential Schools News
List's Name: CESNEWS
Administrative Address: listserv@brownvm.brown.edu
Participation Address: cesnews@brownvm.brown.edu

Topic: Community Education
List's Name: COMUEDUC
Administrative Address: listserv@listserv.net
Participation Address: comueduc@univscvm.csd.scarolina.edu

Topic: Computer Applications in Education: What's New
List's Name: QUIDNOVI
Administrative Address: listserv@listserv.net
Participation Address: quidnovi@asuvm.inre.asu.edu

Topic: Computers in Education
List's Name: INFED-L
Administrative Address: listserv@ccsun.unicamp.br
Participation Address: infed-l@ccsun.unicamp.br

Topic: Computer Graphics Education Newsletter
List's Name: CGE
Administrative Address: listserv@listserv.net
Participation Address: cge@vm.marist.edu

Topic: Computer Networking in Education
List's Name: CNEDUC-L
Administrative Address: listserv@listserv.net
Participation Address: cneduc-l@tamvm1.tamu.edu

Topic: Consortium for School Networking (CoSN)
List's Name: COSNDISC
Administrative Address: listproc@listproc.listproc.net
Participation Address: cosndisc@listproc.listproc.net

Topic: Creative Writing in Education
List's Name: CREWRT-L
Administrative Address: listserv@listserv.net
Participation Address: crewrt-l@mizzou1.missouri.edu

Topic: CU-SeeMe K-12 Users
List's Name: cuseeme-schools
Administrative Address: lists@gsn.org
Participation Address: cuseeme-schools@gsn.org

Topic: Deaf Education: Practical Issues
List's Name: EDUDEAF
Administrative Address: listserv@listserv.net
Participation Address: edudeaf@ukcc.uky.edu

Topic: Disseminating Educational Theory and Practice
List's Name: DISSMN8
Administrative Address: listserv@listserv.net
Participation Address: dissmn8@cmsa.berkeley.edu

Topic: Distance Education Online Symposium
List's Name: DEOS-L
Administrative Address: listserv@listserv.net
Participation Address: deos-l@psuvm.psu.edu

Topic: Drug Abuse Education Information and Research
List's Name: DRUGABUS
Administrative Address: listserv@listserv.net
Participation Address: drugabus@umab.bitnet

Topic: Early Childhood Education
List's Name: ECEOL-L
Administrative Address: listserv@listserv.net
Participation Address: eceol-l@maine.maine.edu

Topic: Early Childhood Education/Young Children (0-8)
List's Name: ECENET-L
Administrative Address: listserv@listserv.net
Participation Address: ecenet-l@vmd.cso.uiuc.edu

Topic: EASI: Equal Access to Software and Information
List's Name: EASI
Administrative Address: listserv@sjuvm.stjohns.edu
Participation Address: easi@sjuvm.stjohns.edu

Topic: Education and Information Technologies
List's Name: EDUTEL
Administrative Address: listserv@listserv.net
Participation Address: edutel@vm.its.rpi.edu

Topic: Education Policy Analysis Forum
List's Name: EDPOLYAN
Administrative Address: listserv@listserv.net
Participation Address: edpolyan@asuvm.inre.asu.edu

Topic: Education Policy Digest
List's Name: EdPOL-D
Administrative Address: edpol-d-request@scholastic.com
Participation Address: edpol-d@scholastic.com

Topic: Educational Administration
List's Name: EDAD-L
Administrative Address: listserv@listserv.net
Participation Address: edad-l@wvnvm.wvnet.edu

Topic: Educational Administration (K-12)
List's Name: K12ADMIN
Administrative Address: listserv@listserv.net
Participation Address: k12admin@listserv.syr.edu

Topic: Educational Computing and Instructional Development
List's Name: ECID-L
Administrative Address: listserv@listserv.net
Participation Address: ecid-l@vm.cc.purdue.edu

Topic: Educational Reform
List's Name: EDREF-L
Administrative Address: listserv@listserv.net
Participation Address: edref-l@admin.humberc.on.ca

Topic: Educational Resources on the Internet
List's Name: EDRES-L
Administrative Address: listserv@listserv.net
Participation Address: e-edres@unbvm1.csd.unb.ca

Topic: Educational Technology
List's Name: EDTECH
Administrative Address: listserv@listserv.net
Participation Address: edtech@msu.edu

Topic: Elementary Student Discussion
List's Name: kidzmail
Administrative Address: listserv@asuacad.bitnet
Participation Address: kidzmail@asuacad.bitnet

Topic: English as a Second Language to Adults
List's Name: TESLIT-L
Administrative Address: listserv@listserv.net
Participation Address: teslit-l@cunyvm.cuny.edu

Topic: English as a Second or Foreign Language to Children
List's Name: TESLK-12
Administrative Address: listserv@cunyvm.cuny.edu
Participation Address: teslk-12@cunyvm.cuny.edu

Topic: English Education
List's Name: ENGLED-L
Administrative Address: listserv@listserv.net
Participation Address: engled-l@psuvm.psu.edu

Topic: English Teaching
List's Name: english-teachers
Administrative Address: majordomo@ux1.cso.uiuc.edu
Participation Address: english-teachers@ux1.cso.uiuc.edu

Topic: Foreign Language Teaching
List's Name: FLTEACH
Administrative Address: listserv@ubvm.cc.buffalo.edu
Participation Address: flteach@ubvm.cc.buffalo.edu

Topic: Gender and Education
List's Name: gened
Administrative Address: majordomo@acpub.duke.edu
Participation Address: gened@acpub.duke.edu

Topic: Genetics (High School Level)
List's Name: GENTALK
Administrative Address: listserv@usa.net
Participation Address: gentalk@usa.net

Topic: Geography Education
List's Name: GEOGED
Administrative Address: listserv@listserv.net
Participation Address: geoged@ukcc.uky.edu

Topic: Geology and Earth Science Education
List's Name: GEOED-L
Administrative Address: listserv@listserv.net
Participation Address: geoed-l@uwf.cc.uwf.edu

Topic: Global SchoolNet (Educational Telecomputing Projects)
List's Name: globalschoolnet-watch
Administrative Address: lists@gsn.org
Participation Address: globalschoolnet-watch@gsn.org

Topic: Global Studies
List's Name: GLBL-HS
Administrative Address: listserv@onondaga.bitnet
Participation Address: glbl-hs@onondaga.bitnet

Topic: Home Education
List's Name: home-ed
Administrative Address: home-ed@think.com
Participation Address: home-ed@think.com

Topic: Home Education Research
List's Name: HMEDRSCH
Administrative Address: listserv@listserv.net
Participation Address: hmedrsch@etsuadmn.etsu.edu

Topic: Hypertext in Education
List's Name: HYPEREDU
Administrative Address: listserv@listserv.net
Participation Address: hyperedu@itocsivm.bitnet

Topic: Integrating Technology in the Schools
List's Name: ITS
Administrative Address: listserv@unmvma.unm.edu
Participation Address: its@unmvma.unm.edu

Topic: Interactive Educational Technologies: Instruction
List's Name: IET-INST
Administrative Address: listserv@listserv.net
Participation Address: iet-inst@uhupvm1.uh.edu

Topic: Interactive Educational Technologies: Technology
List's Name: IET-TECH
Administrative Address: listserv@listserv.net
Participation Address: iet-tech@uhupvm1.uh.edu

Topic: Intercultural E-Mail Classroom Connections
List's Name: iecc
Administrative Address: iecc-request@stolaf.edu
Participation Address: iecc@stolaf.edu

Topic: International Development and Global Education
List's Name: INTDEV-L
Administrative Address: listserv@listserv.net
Participation Address: intdev-l@uriacc.uri.edu

Topic: International Discussion Among Students
List's Name: pmic-penguin
Administrative Address: majordomo@hampstead.k12.nh.us
Participation Address: pmic-penguin@hhampstead.k12.nh.us

Topic: International Education
List's Name: INTER-ED
Administrative Address: listserv@listserv.net
Participation Address: inter-ed@vm1.spcs.umn.edu

Topic: International Society for Comparative Physical Education & Sports
List's Name: ISCPES
Administrative Address: listserv@listserv.net
Participation Address: iscpes@sjsuvm1.sjsu.edu

Topic: International Society for Education Through Art
List's Name: INSEA-L
Administrative Address: listserv@listserv.net
Participation Address: insea-l@unbvm1.csd.unb.ca

Topic: Internet Access for K-12
List's Name: WVNK12-L
Administrative Address: listserv@wvnvm.wvnet.edu
Participation Address: wvnk12-l@wvnvm.wvnet.edu

Topic: Internet Tourbus
List's Name: tourbus
Administrative Address: majordomo@colossus.net
Participation Address: tourbus@colossus.net

Topic: Internet Use in K-12 Education
List's Name: network_nuggets-L
Administrative Address: listserv@cln.etc.bc.cab
Participation Address: network_nuggets-l@cln.etc.bc.cab

Topic: Japanese Teachers
List's Name: JTIT-L
Administrative Address: listserv@psuvm.psu.edu
Participation Address: jtit-l@psuvm.psu.edu

Topic: Journalism Education
List's Name: JOURNET
Administrative Address: listserv@listserv.net
Participation Address: journet@qucdn.queensu.ca

Topic: Journalism: High School Scholastic
List's Name: HSJOURN
Administrative Address: listserv@vm.cc.latech.edu
Participation Address: hsjourn@vm.cc.latech.edu

Topic: Journal of Technology Education
List's Name: JTE-L
Administrative Address: listserv@listserv.net
Participation Address: jte-l@vtvm1.cc.vt.edu

Topic: Journal of Virtual Reality in Education
List's Name: JVRE-ALL
Administrative Address: listserv@listserv.net
Participation Address: jvre-all@sjuvm.stjohns.edu

Topic: Kids' Global Networking
List's Name: KIDLINK
Administrative Address: listserv@vm1.nodak.edu
Participation Address: kidlink@vm1.nodak.edu

Topic: Kids' Global Networking
List's Name: KIDSPHERE
Administrative Address: kidsphere-request@vms.cis.pitt.edu
Participation Address: kidsphere@vms.cis.pitt.edu

Topic: Kids' Online "Cafe" (discussion)
Lists' Names: KIDCAFE-INDIVIDUAL (keypals)
KIDCAFE-TOPICS (discussion topics)
KIDCAFE-QUERY (questions)
KIDCAFE-SCHOOL (group communications)
Administrative Address: listserv@vm1.nodak.edu
Participation Addresses: kidcafe-individual@vm1.nodak.edu
kidcafe-topics@vm1.nodak.edu
kidcafe-query@vm1.nodak.edu
kidcafe-school@vm1.nodak.edu

Topic: Language and Education in Multilingual Settings
List's Name: MULTI-L
Administrative Address: listserv@listserv.net
Participation Address: multi-l@vm.biu.ac.il

Topic: Law and Education
List's Name: EDLAW
Administrative Address: listserv@listserv.net
Participation Address: edlaw@ukcc.uky.edu

Topic: Library/Information Science Education
List's Name: JESSE
Administrative Address: listserv@listserv.net
Participation Address: jesse@utkvm1.utk.edu

Topic: Library Media Specialists (K-12 Schools)
List's Name: LM_NET
Administrative Address: listserv@suvm.syr.edu
Participation Address: lm_net@suvm.syr.edu

Topic: Library Services to Children & Young Adults
List's Name: PUBYAC
Administrative Address: listserv@lis.pitt.edu
Participation Address: pubyac@lis.pitt.edu

Topic: Literature for Children and Youth
List's Name: KIDLIT-L
Administrative Address: listserv@bingvmb.cc.binghamton.edu
Participation Address: kidlit-l@bingvmb.cc.binghamton.edu

Topic: Marine Scientists: High School Student Exchange
List's Name: FISH-JUNIOR
Administrative Address: listserv@searn.sunet.se
Participation Address: fish-junior@searn.sunet.se

Topic: Math Education
List's Name: MATHED
Administrative Address: listserv@listserv.net
Participation Address: mathed@kentvm.kent.edu

Topic: Mathematics Teachers
List's Name: NCTM-L
Administrative Address: listproc@sci-ed.fit.edu
Participation Address: nctm-l@sci-ed.fit.edu

Topic: Math Problem Solving Skills
List's Name: mathmagic-general-open
Administrative Address: majordomo@forum.swarthmore.edu
Participation Address: mathmagic-general-open@forum.swarthmore.edu

Topic: Media for Kids
List's Name: kid.media
Administrative Address: kid.media-request@airwaves.chi.il.us
Participation Address: kid.media@airwaves.chi.il.us

Topic: Media in Education
List's Name: MEDIA-L
Administrative Address: listserv@listserv.net
Participation Address: media-l@bingvmb.cc.binghamton.edu

Topic: Mentally Retarded Deaf Education
List's Name: MRDEAF-L
Administrative Address: majordomo@bga.com
Participation Address: mrdeaf-l@bga.com

Topic: Middle Level Education/Early Adolescence (10-14)
List's Name: MIDDLE-L
Administrative Address: listserv@listserv.net
Participation Address: middle-l@vmd.cso.uiuc.edu

Topic: Multicultural Education
List's Name: MULTC-ED
Administrative Address: listserv@listserv.net
Participation Address: multc-ed@umdd.bitnet

Topic: Music Education
List's Name: MUSIC-ED
Administrative Address: listserv@listserv.net
Participation Address: music-ed@vm1.spcs.umn.edu

Topic: Network Use in Education
List's Name: EDNET
Administrative Address: listserv@nic.umass.edu
Participation Address: ednet@nic.umass.edu

Topic:	Newer Patterns in Education
List's Name:	NEWEDU-L
Administrative Address:	listserv@listserv.net
Participation Address:	newedu-l@uhccvm.uhcc.hawaii.edu

Topic:	Novae Group: Teachers Networking for the Future (Digest of Ed. Telecomputing Information)
List's Name:	novae
Administrative Address:	listserv@idbsu.idbsu.edu
Participation Address:	c6460101@idptv.idbsu.edu

Topic:	Online Educational Telecomputing Projects (K-12)
List's Name:	KIDPROJ
Administrative Address:	listserv@vm1.nodak.edu
Participation Address:	kidproj@vm1.nodak.edu

Topic:	Physical Education: United States
List's Name:	USPE-L
Administrative Address:	listserv@listserv.vt.edu
Participation Address:	uspe-l@listserv.vt.edu

Topic:	Physics Education: New Technologies
List's Name:	NTWFORUM
Administrative Address:	listserv@listserv.net
Participation Address:	ntwforum@indyems.iupui.edu

Topic:	Physics: High School
List's Name:	PHYSHARE
Administrative Address:	listserv@psuvm.psu.edu
Participation Address:	physhare@psuvm.psu.edu

Topic:	Physics Teachers' Forum
List's Name:	PHYS-L
Administrative Address:	listserv@uwf.cc.uwf.edu
Participation Address:	phys-l@uwf.cc.uwf.edu

Topic: Play, Games, and Sport: Multidisciplinary Perspectives
List's Name: PLAY-L
Administrative Address: listserv@hg.uleth.ca
Participation Address: play-l@hg.uleth.ca

Topic: PRESTO: Preservice and Student Teachers Online
List's Name: PRESTO
Administrative Address: listproc@ra.msstate.edu
Participation Address: presto@ra.msstate.edu

Topic: Prison Teachers
List's Name: PRISON-L
Administrative Address: listserv@dartcms1.dartmouth.edu
Participation Address: prison-l@dartcms1.dartmouth.edu

Topic: Qualitative Research in Education
List's Name: QUALRSED
Administrative Address: listserv@listserv.net
Participation Address: qualrsed@unmvma.unm.edu

Topic: Quality of Education
List's Name: BGEDU-L
Administrative Address: listserv@listserv.net
Participation Address: bgedu-l@ukcc.uky.edu

Topic: Research in Educational Technologies
List's Name: EDP513
Administrative Address: listserv@listserv.net
Participation Address: edp513@listserv.arizona.edu

Topic: Restructuring Public Education
List's Name: RPE-L
Administrative Address: listserv@listserv.net
Participation Address: rpe-l@uhccvm.uhcc.hawaii.edu

Topic: School Management
List's Name: school-management
Administrative Address: mailbase@mailbase.ac.uk
Participation Address: school-management@mailbase.ac.uk

Topic: School Nurses
List's Name: SCHLRN-L
Administrative Address: listserv@ubvm.cc.buffalo.edu
Participation Address: schlrn-l@ubvm.cc.buffalo.edu

Topic: Science Education Computer Applications
List's Name: APPL-L
Administrative Address: listserv@listserv.net
Participation Address: appl-l@vm.cc.uni.torun.pl

Topic: Science Education Reform
List's Name: NCPRSE-L
Administrative Address: listserv@listserv.net
Participation Address: ncprse-l@ecuvm.cis.ecu.edu

Topic: Science Teaching in Elementary Schools
List's Name: T321-L
Administrative Address: listserv@mizzou1.missouri.edu
Participation Address: t321-l@mizzou1.missouri.edu

Topic: Small or Rural Schools Education
List's Name: K12SMALL
Administrative Address: listserv@listserv.net
Participation Address: k12small@uafsysb.uark.edu

Topic: Special Education
List's Name: SPECED-L
Administrative Address: listserv@listserv.net
Participation Address: speced-l@uga.cc.uga.edu

Topic: Special Education Topics
List's Name: spedtalk
Administrative Address: majordomo@virginia.edu
Participation Address: spedtalk@virginia.edu

Topic: Student Book Reviews (K-12)
List's Name: BR_Review
Administrative Address: listproc@micronet.wcu.edu
Participation Address: br_review@micronet.wcu.edu

Topic: Students With International Educational or Work Experience
List's Name: pmic-mura
Administrative Address: majordomo@hampstead.k12.nh.us
Participation Address: pmic-mura@hhampstead.k12.nh.us

Topic: Talented and Gifted Education
List's Name: TAG-L
Administrative Address: listserv@listserv.net
Participation Address: tag-l@vm1.nodak.edu

Topic: Technology in Education
List's Name: JEI-L
Administrative Address: listserv@listserv.net
Participation Address: jei-l@umdd.bitnet

Topic: Today in History
List's Name: today
Administrative Address: majordomo@pobox.com
Participation Address: today@pobox.com

Topic: U.S. Dept. of Education News
List's Name: EDInfo
Administrative Address: listproc@inet.ed.gov
Participation Address: edinfo@inet.ed.gov

Topic: U.S. Secretary of Education's Satellite Town Meetings
List's Name: SATL-CON
Administrative Address: listserv@listserv.net
Participation Address: satl-con@listserv.syr.edu

Topic: Virtual Reality for K-12 Education
List's Name: VRSCHOOL
Administrative Address: listserv@suvm.syr.edu
Participation Address: vrschool@suvm.syr.edu

Topic: Vocational Education
List's Name: VOCNET
Administrative Address: listserv@cmsa.berkeley.edu
Participation Address: vocnet@cmsa.berkeley.edu

Topic: Volunteers In Service to America
List's Name: VISTA-L
Administrative Address: listserv@american.edu
Participation Address: vista-l@american.edu

Topic: Waldorf Education
List's Name: waldorf-l
Administrative Address: waldorf-l-request@netcom.com
Participation Address: waldorf-l@netcom.com

Topic: Wildlife Education
List's Name: COM-WILD-L
Administrative Address: claire@access.digex.net
(Please send a personal message.)
Participation Address: com-wild-l@access.digex.net

Topic: World Wide Web in Education
List's Name: WWWEDU
Administrative Address: listserv@k12.cnidr.org
Participation Address: wwwedu@k12.cnidr.org

Index

.cpt files 83, 85, 86, 87
.gif files 66, 76, 77, 83, 87
  Viewing in DOS 87
.hqx files (see BinHex (.hqx) files)
.plan files 117, 122
.project files 117, 122
.ps files 76, 77
.sea files 81, 86
.wave files 76
.Z files 66, 83
.zip files 66, 82, 87
.zoo files 83
50th Anniversary of D-Day project 142
A Day Without Art observation 174
A Vision project 157
Academy One project 142, 172, 174
Academy One services 141
Account, Internet 4-5
Activities, educational 129-179
  Information Collections 147-165
    Database creation 152-156
    Electronic publishing 157-159
    Information exchanges 147-152
    Pooled data analysis 163-165
    Telefieldtrips 159-163
  Interpersonal Exchanges 130-147
    Electronic appearances 141-142
    Electronic mentoring 142-143
    Global classrooms 137-140
    Impersonations 145-147
    Keypals 131-136
  Problem-Solving Projects 165-178
    Electronic process writing 168
    Information searches 165-166
    Parallel problem solving 170-173
    Sequential creations 168-169
    Simulations 174-175
    Social action projects 176-178
Archie 10, 59, 70-73
  By electronic mail 97
  Sample search 71
  Server sites 70
Architectural challenge 170
Archives, educational 69
  ASCII files 69
  AskEric archive 69
  History archive 69
  Lyric and Discography archive 69
  Project Gutenberg 60, 61, 62, 64, 65, 69
  Project Hermes 69
  Texas Center for Educational Technology 5
  University of Illinois' Learning Resources Server 179
Armadillo Gopher 32
ARPANet network 119
ASCII art 97
ascii command 78
ASCII text files 59, 66
  Opening 76
  Transferring 60-70
Ask Dr. Math service 146

Ask Mr. Science project 143
Ask-A-Geologist service 144
Authors Online project 141
binary command 78, 86
Binary files
  BinHex (see BinHex (.hqx) files)
  Opening 76
  Recognizing 76
BinHex (.hqx) files 78-81, 85, 87
  Opening 79
BinHex software 79, 80, 85, 87
  Sites 81
Bookmarks
  Gopher 15
  WWW 34
Browser 27
Bulletin boards (see Newsgroups)
bye command 69
California Missions project 145
Career Panel 142
cd command 63, 64
cdup command 63, 68
Centennial Launches project 174
Characters Online project 145
Chat feature 46, 141
CHAT Telnet site 49
Chronicle 199
CitySpace 174
Clearinghouse for Subject-Oriented Internet Resource Guides 99
Cleveland Freenet Telnet site 52, 141, 142, 172, 174
Clickable map 30
College-Wide Information System (CWIS) 46
Colonial Computing project 146
Column Count project 165
Compact Pro program 83, 85, 86, 87
Compressed files 81-87
  Opening 81-83
  Uncompressing files 81-87
    Sample 83-88
Compression/uncompression software 83
  Decrypting 87
  Downloading 87
  Transferring 85-86
Computer conferences (see Newsgroups)
Computer conferencing 3
Cost of Internet use 5
CWIS (see College-Wide Information System)
Database creation activities (see Activities, educational)
Decrypting files 80, 81, 85, 86, 87
Desert and Desertification project 140
dir . filename command 66
dir command 62, 64, 65, 66
Directories
  Asynchronous 121
  Interactive 119
  Internet Resource Directory 69
  Knowbot Information Server 120
  Netfind sites 119
  Netfind User Lookup 119
  Telnet 48
  Usenet User List 121
  User 115, 119, 121
  Whois 119
Discussion groups 3, 9, 103-114
Distribution lists (see Listservs)
Doomed Train project 168
Downloading (see File transfer)
Earth's Crust and Plate Tectonics Project 194
Eco-Entrepreneurs challenge 171
EDTECH list 107
Educational activities (see Activities, educational)
Electronic appearances activities (see Activities, educational)
Electronic bulletin boards (see Newsgroups)
Electronic Emissary 142
Electronic Library Card Catalogs 51
Electronic mail 2, 91-93
  Address 91
  and Archie 70

BinHex file transfer 78
Chat feature 141
Discussion groups 103-114
Educational activities 130
File transfer 60, 94-101
Finding addresses 119, 121
Fingering addresses 116
Message 92
Electronic mentoring activities (see Activities, educational)
Electronic process writing activities (see Activities, educational)
Electronic publishing activities (see Activities, educational)
Emoticons 71
Encrypted files 79, 81, 85
English-teachers mailing list 108
Eratosthenes Experiment 165
Ethnic cookbook 158
Extensions, file
Binary file 76
Compressed file 83
Graphics file 76
Self-extracting files 86
Text file 65, 66, 76
FAQ (see Frequently Asked Questions)
File management 88
File transfer 59-101
Anonymous FTP 63, 76, 83, 110, 169
ASCII text files 60-70
BinHex files 78
E-mail 60, 94-101
From account space to PC 78, 87
FTP (see FTP sessions)
File Transfer Protocol 3
Finding mailing lists of interest 108
Finger command 116, 118, 122
Fingering 116-119, 122-125
.plan files 122
.project files 122
Other information 122-125
User information 116
Fishy Habits project 172
Floating boats activity 171
FOSTER On-Line project 162
Fred interface to user databases 119
Frequently Asked Questions (FAQ) 98
ftp command 61, 69
ftp program 62, 67, 69
FTP sessions 3, 60
Anonymous FTP 63, 76, 83, 110, 169
Archives 69
ASCII text files 60-70
Connecting 61
Exiting 69
Navigating 62
Obtaining files 67
Previewing files 68
FTP sites 33
FTPmail
Gateway service 94-101
Program commands 95
GeoGame project 165
get command 67, 78, 87, 95
Getting to Know You project 133
GIF Converter program 83, 85, 87
Global classroom activities (see Activities, educational)
Global Grocery List project 165
Global Schoolhouse Project 157, 178
Global SchoolNet Foundation 159
Global Student Newswire 158
GLOBALED list 106
Gopher 10-17, 53, 152
Bookmarks 15
Menu 12
Menu question marks (?) 12
Menu slashes (/) 12
Sites 24
Gopher tools 9
Graphics files 76
Viewing in DOS 87
Graphics Workshop 87
Help 108
History of Life course 143
History page 41

Home Gopher 11
Horned lizard 192
HTML 31
http (see Hypertext Transfer Protocol)
Hypertext Transfer Protocol (http) 32
I*EARN (International Education and Resource Network) 157, 176
Impersonation activities (see Activities, educational)
Important Events Survey 156
INDEX file 68
Inform oneself 190
Information exchange activities (see Activities, educational)
Information location tools 18-25
Information search activities (see Activities, educational)
Interactive Telnet sessions (see Telnet, Sessions)
International Arctic Project 160
International Folk Games Project 149
International Student Space Simulations project 175
Internet
  Account 4-5
  Address 91
  Resource guides 48
Internet Resource Directory for Educators 69, 70
IRD (see Internet Resource Directory for Educators)
Islands 160
Isogonic maps 164
Jaunts project 156
Jughead 19, 23-24
K-12 HotList 40
K-12 servers 194
Keypal activities (see Activities, educational)
KIDCLUB Internet Relay Chat 173
KIDPROJ discussion list 133
KIDPROJ FLAGS PROJECT '95 152
KIDPROJ listserv group 138
KIDSNET listserv group 160
KIS (see Knowbot Information Server)
Knowbot Information Server (KIS) 120
Launching pad and rocket 171
LIBS (see Electronic Library Card Catalogs)
List searching services 109
Listservs 104
  Administrative address 104
  Canceling subscription 106
  Commands 104
  Posting address 106
  Posting messages 106
  Requesting file list 107
  Subscription 104
  Whether to subscribe 107
Live From... Other Worlds project 162
Loving Names list 151
Low-level ozone readings 164
ls (list) command 95
Lynx 28, 36
MacBinary option 81, 87
Mail2news 113
Mailing lists (see Listservs)
  Newsgroups receive postings 114
Majordomo 108
Martin Luther King, Jr. Bibliography Telnet site 50
MathMagic project 172
MayaQuest project 161
Michael Jackson Ranch 159
MicroMuse Telnet site 49
Minuet Archive 264
Monarch butterfly migration project 165
more command 68
NandoNext 224
National Educational Supercomputing Program (NESP) 175
National Student Research Center 163
National Student Research Center at Mandeville Middle School 158
Native American ChainStack 170
NESPUT (National Educational Simulations Project Using Telecommmunications) 174
netfind command 119

Netfind sites 119
Netfind User Lookup directory 119
Netscape 28
Newsday project 157
Newsgroups 109-114
  Creating 110, 114
  For educators 110-112
  Local 110, 114
  Moderated 112-113
  Receive mailing list postings 114
  SCHLnet 112-113
  Unmoderated 110
Newsgroups via Gopher 113
Newsreader program 109
Noninteractive file transfers (see FTP sessions)
Opening URLs in Lynx 40
Operating system
  Unix 46, 60, 68, 69, 83, 116, 117, 122
  VMS 46, 60
Other kinds of mailing lists 108
Parallel problem-solving activities (see Activities, educational)
Passport to Knowledge project series 160
PLANET Project 177
Poem about world peace 168
Pooled data analysis activities (see Activities, educational)
Ports 47
PPP 44
Practice information-seeking skills 189
Print command 43
Problems program 193
Project Gutenberg (see Archives, educational), 94
Project IDEALS 175
Project Marco Polo 160
Project Population 194
Pub or public subdirectories 63
Publish synthesized and/or critiqued information overviews 193
Publishing
  WWW pages 31
Puzzle Now! project 171
Question-and-Answer Services 144
QuickTime software 76
README file 68
Realtime interactive connections (see Telnet, Sessions)
Review multiple perspectives 191
Reynoldsburg Geography Project 136
Save the Beaches project 177
SCHLnet (see Newsgroups)
Science and Technology Information System (STIS) Telnet site 47
Search engines 35
Searches
  By file name 70-73
  By Gopher directory names 23-24
  By topic 18
  Gopher 10
Seasons project 155
Sequential creation activities (see Activities, educational)
SIG/Tel list 104
  Addresses 106
signoff command 107
Simulation activities (see Activities, educational)
SLIP 44
Smileys 71
Social action project activities (see Activities, educational)
Software files 76
Solar Sailing Simulation project 157
Solve an authentic problem 192
Sound files 76
Soundblaster files 76
Spacelink 29, 41
  Telnet site 45, 49
Spotlight on People activity 142
STIS (see Science and Technology Information System)
Students Exploring Cyberspace (SECs) 193
StuffIt Expander program 83, 86
sub command 105
Subdirectories 63

Synergy project 169
Teacher Contacts Lists 92
Tele-election projects 164
Telecommunications vigil 176
Telefieldtrip activities (see Activities, educational)
TeleOlympics project 172
Telnet
  Connecting 46
  Resource directories 48
  Sessions 3, 45-57
  Sites 33
    Resource collection 50-52
    Single-resource 48-50
telnet command 46, 71
TENET (see Texas Education Network)
Texas Education Network (TENET) 4, 12, 16, 28, 37, 38, 39, 60, 91, 116, 117, 193, 206
Texas history project 152
The Chronicle of Higher Education 199
The Contemporary 157
The Geography Project—4 190
The Great Computer Challenge Internet Scavenger Hunt 189
The S.S. Central America—A Shipwreck to Remember project 140
The SANTA LETTERS project 147
The World at Our Fingertips project 132
Town Twinning project 133
U.S. Weather Service Telnet site 47
Ultraviolet radiation levels 164
Uncompressing files (see Compressed files)
Uniform Resource Locator (URL) 31
Unix-created audio files 76
URL (see Uniform Resource Locator)
Usenet News 3, 109, (see also Newsgroups)
Usenet User List service 121
User directories 115, 119, 121
VaPEN (see Virginia's PEN)
Veronica 18, 19
  High traffic 19
  Sample search 21
Video files 76
Virginia's PEN (Public Education Network) 145, 171
Virtual gatherings 173
Vocal Point 231
WAIS (see Wide Area Information Server)
Water acidity projects 164
WebCrawler 186, 188
WebMail 99
What's in a Name? project 167
What's So Funny? project 150
Where in the World is the Mystery Elementary School? project 166
Whois directory 119
Wide Area Information Server (WAIS) 53-57
Wolf Studies Project 162
World Connections Fair project 177
WorldWindow Telnet site 52
Writers in Electronic Residence project 168
Writers' Corner 170
WWW (World Wide Web)
  Bookmarks 34
  Pages by e-mail 99
  Publishing pages 31
  Searches 34
  Servers
    Offered by K-12 schools 31
X.500 (user) databases 119
|more (pipe more) command 68, 69

296

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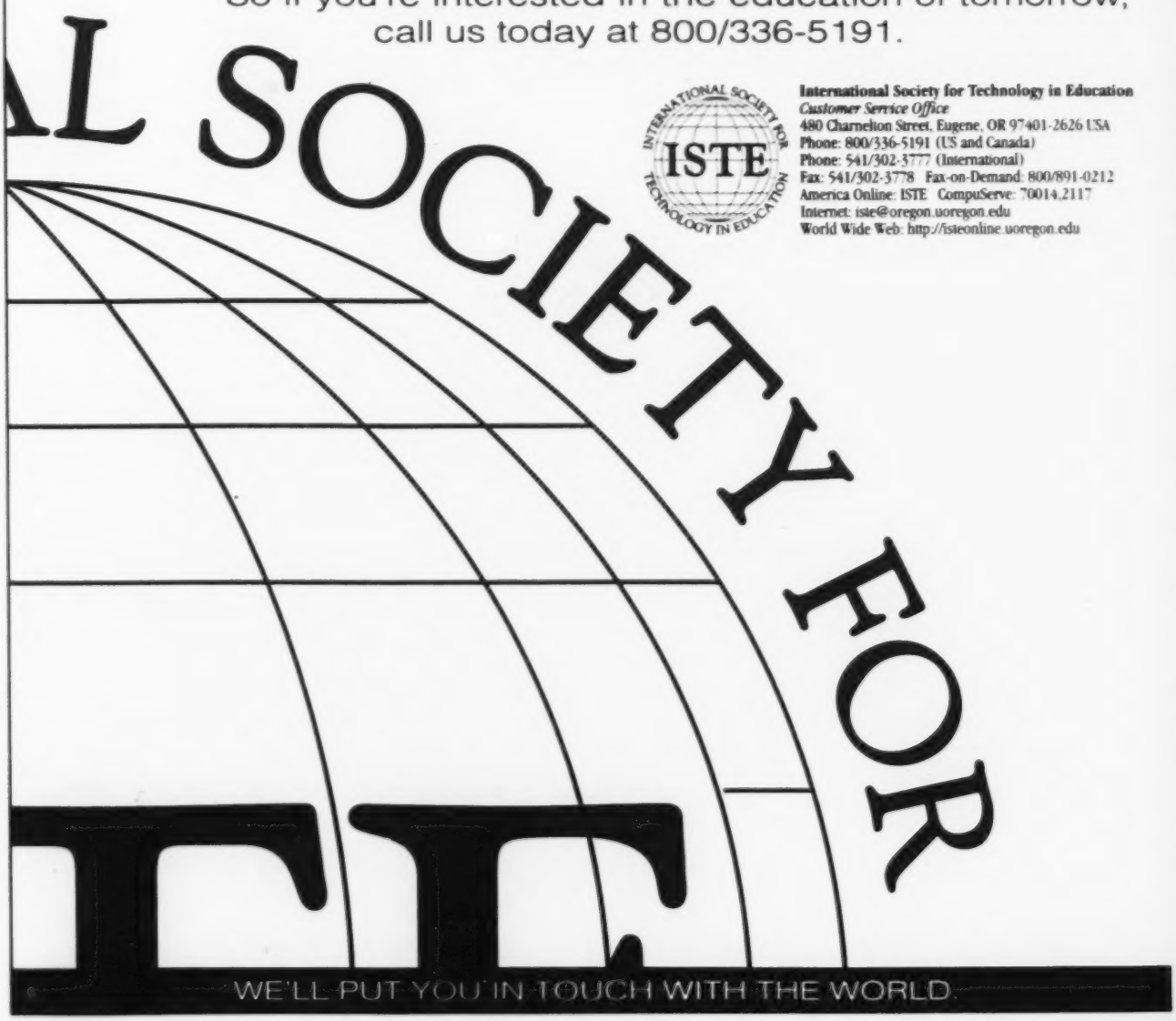

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